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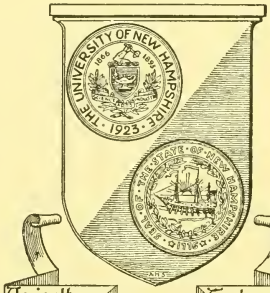

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THE WOODY PLANTS OF NEW HAMPSHIRE

By ALBION R. HODGDON and FREDERIC L. STEELE

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Acknowledging freely all the help given us by these and others, we wish also to make it clear that we assume all responsibility for errors or omissions in this work.

The Woody Plants of New Hampshire

By Albion R. Hodgdon and Frederic L. Steele*

THE appearance in 1950 of the 8th edition of *Gray's Manual* by M. L. Fernald has now made inadequate many of the earlier standard treatments dealing with local areas within the "manual range". Certain species have been found only recently to be comprised of two or more geographically and morphologically distinct populations. One such species is *Alnus rugosa* which has a more northern phase quite distinct in central and northern New England called var. *americana*, having leaves glaucous or somewhat whitish beneath. Such major subdivisions of species are customarily included in a work of this sort. The genus *Amelanchier* has been completely revised; only four species for the entire range were included in the 7th edition of *Gray's Manual* in 1908, while in New Hampshire alone we now recognize eight species. A number of other examples could be given, either of the recognition of new species, or of geographical varieties. Many new forms have been recognized and many hybrids noted. In addition to these additions in taxonomy there have been numerous changes of names and some transfers to different genera or families. A further reason for projecting this work is our greatly expanded knowledge concerning the geographic and ecologic distribution of the taxons that comprise our flora. Thus, the present treatment adds a few species as well as many varieties and forms to the published woody flora of New Hampshire and clarifies the range within the state of many others that have long been known to occur within its borders.

No local flora has ever been published covering all the species of the entire state of New Hampshire. Prof. A. S. Pease's *Vascular Flora of Coos County* (1926) is an outstanding work for that area. John Foster's booklet, *Trees and Shrubs of New Hampshire* (1929), a good guide to the less critical of our woody species, includes brief notes as to their ranges and habitats. Varieties and forms are not included and some of the species in more difficult groups, such as *Salix*, are omitted. Several other local floras cover small areas. The present work attempts to give a complete list of all the woody plants of the state with notes as to their range, environment, and state of abundance.

We have rather rigidly followed the classification used by Fernald in *Gray's Manual*, 8th edition; all species, varieties, and forms accepted in that work which we have been able to locate in New Hampshire are included in our treatment, the major exception being *Carya ovalis* which is treated differently for reasons discussed in the text. It seems to us that Professor Fernald's treatment works out well for the state of New Hampshire, the principal objections being that hybridization seems to be somewhat more prevalent in certain groups than is suggested, and the range of variation in

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some taxons much greater than one is led to expect. Also, as noted in the Manual, the taxonomic problems in the genus *Crataegus* have not yet been solved.

The plan has been to canvass all herbaria thoroughly and critically, to acquire personal familiarity in the field with nearly all species and varieties in the area, and finally to become thoroughly familiar with the literature dealing with our woody flora. The chief herbaria examined were those of the New England Botanical Club, Gray Herbarium, Arnold Arboretum, Dartmouth College (Jesup), St. Anselm's College, Brewster Academy (Sargent collection), The Manchester Institute of Arts and Sciences (F. W. Batchelder collection), and the University of New Hampshire. The field work has involved continuous effort in southeastern New Hampshire and the central and southern parts of the White Mountains and northern Carroll and Grafton counties by one or both authors working separately, as well as a number of extensive joint forays to selected areas in each of the counties, the objective being to perfect and complete the check lists for the entire state, county by county. In particular, Sullivan, Belknap, and Merrimack counties had been inadequately botanized. This, we have been able to remedy in major part so far as the woody plants are concerned during the past three years. The objective of the field work has been, not only to obtain range records of taxons, but to gain a critical understanding of the extent of variation, habitat-preference, and abundance of each.

Above all it has been the intention to know each taxon intimately even in such difficult groups as *Salix*, *Rosa*, *Amelanchier*, and *Vaccinium*. Only in *Crataegus* have we failed to achieve a feeling of reasonable field competence in identification. No help from authorities has been sought in the identification of any species, but, for the most part, the identifications on the sheets of herbarium specimens made by specialists in the above groups, as well as in many others, have been accepted without question and have been most helpful in educating us in field identification. Where there has been difficult with specimens in the field, these have been collected and checked carefully against herbarium sheets. Although there probably have been errors, for which the authors must bear sole responsibility, every effort has been made to keep them to a minimum.

We have constantly leaned upon Professor Pease's *Vascular Flora of Coos County* (1924). It is much to be regretted that his revised flora which has now been awaiting a publisher for several years is not available. *The Woody Plants of Maine* by Fay Hyland and F. H. Steinmetz (1944) has proven of great reference value and also has served as a guide to the organization of our work, while the *Check List of Vascular Plants of Maine* by E. C. Ogden, F. H. Steinmetz, and F. Hyland has suggested part of the format for this treatment.

This work is intended to comprise all of the woody perennial plants occurring naturally in New Hampshire. The distinction between low or weak shrubs or herbs must be made somewhat arbitrarily since there is no abrupt line of demarcation between them. *Epigaea repens* and *Linnaea borealis* are included chiefly because they are in plant families in which nearly all of the members are woody. *Mitchella repens* seems to be more herbaceous than either of the foregoing but, occurring as it does in somewhat similar habitats or assuming a habit somewhat similar to them, it also was included. *Diapensia lapponica* belongs ecologically to an alpine

assemblage, many of the characteristic members of which are distinctly woody, though it might equally well be considered herbaceous. Plants with characteristically biennial above ground stems are excluded even though as with *Rubus alleghenicnsis* they are somewhat woody. It has thus been possible to omit the highly technical genus *Rubus* in which there are many unsolved taxonomic problems.

Of the very considerable number of trees and shrubs which are native to other parts of the world and which have been planted in New Hampshire, only those species have been included which tend to escape and become naturalized or which have been observed to grow under such conditions that they might appear to be native. Shrubs or trees persisting around old deserted houses, cemeteries, etc., are accepted only if they have displayed an aggressive tendency to reproduce either by vegetative means or by seeds.

The following brief geographical discussion may make the range-designations accompanying each taxon more meaningful. The White Mountains proper occupy an area from central Carroll and Grafton counties north to the Canadian border. The Presidential Range includes the highest peaks and is about in the center of the White Mountain area. These and the Franconia Range to the west of them are of sufficient elevation (above 4,800 ft.) to have extensive alpine areas above the forest. Occasional small alpine areas occur elsewhere as noted below. Some of the other mountains have rocky summits, probably because the original forest-cover was removed by fire. South of the White Mountains there are occasional peaks of moderate elevation, of which Mt. Monadnock in southwestern New Hampshire is the best known and highest.

The principal rivers are the Androscoggin, Merrimack, Connecticut, and Saco, all of which have apparently served as migration-routes for many kinds of plants. There is, in addition to the above, a considerable number of small rivers emptying into Great Bay and the Piscataqua River in southeastern New Hampshire.

The early modification of the Piscataqua River's tributary streams and of the Merrimack by constructing dams undoubtedly altered the vegetation to a considerable degree. This is particularly true of those plants which normally occur near the water-line. In more recent times the high dams of the upper Connecticut River have raised the water level for many miles back of them and thus have provided very uninteresting shores botanically speaking. In general, the flora along the river is much more interesting below the dams.

We have arbitrarilly divided the state into northern, central, and southern parts. Northern New Hampshire comprises the area of the White Mountains, and includes river-valleys and any other low-land in the vicinity. Essentially this takes in the northern half of Carroll and Grafton counties and, of course, all of Coos County. Central New Hampshire covers the southern halves of Carroll and Grafton counties, most of Sullivan County except the southernmost townships, the northern part of Merrimack County and the northern half of Strafford County. In eastern New Hampshire a natural division occurs between central and southern New Hampshire in a range of high hills extending westward or southwestward toward the Merrimack Valley. This range includes Parker and Catamount mountains. There is no such division farther west in the valleys of the

Merrimack and Connecticut rivers or in the upland west of the Merrimack River, although Sunapee Mountain lies about at the boundary intended here. Southern New Hampshire includes all of Rockingham, Hillsborough, and Cheshire counties, about half of Strafford County, the southern part of Merrimack County, and the southernmost part of Sullivan County.

We have endeavoured to designate the elevations at which the various species are to be found whenever there might be any question. The term "low elevation" refers to areas from 0 to 1,500 feet; "medium elevation" refers to areas from 1,500 feet to tree-line which occurs almost exclusively in the Presidential and Franconia ranges and varies from 4,500 to 5,000 feet, rarely descending to the 4,000-foot level. "Alpine areas" or "alpine zone" refers to the region above tree-line occupied by low shrubs, herbs, or bare rock. Many of its plants have Arctic affinities. In addition to the above-mentioned ranges, small alpine areas occur on Guyot and Bond mountains in the Twin Range as well as above the cliffs of Mt. Cannon and on the summit of Mt. Moosilauke. "Subalpine" applies to the occasional areas, mostly in the floors of ravines in the Presidential Range, where the trees are much stunted and conditions rather resemble the alpine area.

All of southeastern New Hampshire is at low elevation. In southwestern New Hampshire there are a number of scattered mountains of elevations up to 2,400 feet, with Monadnock an isolated peak at 3,100 feet. Much of central New Hampshire is low, but with frequent uplands and mountainous areas reaching 2,500 feet and occasionally 3,000 feet. Most of northern New Hampshire is of medium and high elevation, the principal river valleys being exceptions, and also the considerable area approaching the Connecticut Valley in northwestern Grafton and western Coos counties.

Climate is without doubt an important factor governing the distribution of plants in New Hampshire. The average annual precipitation varies from 38 to 46 inches at low and medium elevations; it is highest in extreme northern New Hampshire and lowest in a band across the state near Colebrook and along the Connecticut at Charlestown and Walpole. The higher mountains may receive up to twice as much. The average annual temperature varies from 40° to 45°F. being lower in the north and increasing southward. Average temperatures for July at low and medium elevations vary from 66°F. in the far north to 68°F. in the center and to 70°F. in some parts of extreme southern New Hampshire, while January averages vary from as low as 12°F. in the far north to as high as 22°F. in the southeast. The length of the growing season as determined by the number of consecutive days without killing frosts varies from an average figure of 100 days in the northernmost part to 140 in the southernmost area. Much of northern and central New Hampshire, apart from the higher mountains, has about 120 consecutive frost-free days. The frost-free growing season is perhaps of greater importance in determining agricultural potentialities than in affecting native woody vegetation, since the native perennial species are only rarely harmed even by unseasonable frosts. In a general way it is possible to correlate the more pronounced vegetational types with the regional climates within the state.

The major soil types also show a fair degree of correlation with the vegetational associations. This is to be expected in view of the fact that vegetation plays an important role in the genesis of soils. Typical podzols are found over much of the state except for the areas of low elevation in

the southern and south-central parts and most of the middle Connecticut Valley. Podzols in New Hampshire are commonly associated with coniferous forests either pure or in mixture with northern hardwoods. Contributing climatic factors are short and cool growing seasons which permit the accumulation of considerable quantities of acid organic material on the forest floor. South and west of the area of podzols and embracing parts of Strafford, Belknap, Merrimack, Hillsborough, and Cheshire counties, as well as the middle and lower Connecticut Valley, is an area of brown podzolic soils. Characteristically these are associated with deciduous forests or mixtures of deciduous species in fairly strong concentration with conifers. Higher temperatures, with less effective moisture, contribute to the formation of brown podzolic soils. A special type of this class of soils is characteristic of the middle and lower Connecticut Valley and also of southeastern New Hampshire including southeastern Hillsborough and much of Rockingham and southern Strafford counties. The characteristics of parent material would seem to account in part for the distinctive quality of this soil type. It may be that the prevalence of species of *Carya* in southeastern New Hampshire and in the Connecticut Valley is due to the similarity of the soils in the two widely separated areas.

The more detailed classification of the major soil-types into numerous classes, based on soil-texture differences which has proven useful in agricultural and land use programs, seems to show few if any consistent correlations with natural woody vegetation in New Hampshire.

The following brief discussion of the natural woody vegetation of New Hampshire is necessarily incomplete. Many of the factors that control the distribution of forest associations and of individual species are not well understood. Moreover the complicated handling of the forest by man during the past 300 years has greatly exaggerated the natural diversity of forest types, making it difficult to account for most of our present forest associations.

As pointed out above, it is possible to relate certain of the more conspicuous forest types in a general way to climatic or soil factors. The very striking restriction of the natural ranges of *Thuja occidentalis* and of *Picea glauca* to parts of New Hampshire west and north of the Presidential Range would appear to show a more specific chemical relationship involving calcium in the soil.

There are very few places where one can still find communities of woody species in an undisturbed condition, and unfortunately without exception these are either difficult of access or are the kinds of places for which man has had no use. The original vegetation of fully two-thirds of the state is not represented at all.

Undisturbed areas are often spectacularly beautiful and they are invariably of great interest to the biologist. The most appealing of all are the well known alpine areas of the Presidential and Franconia ranges where both climate and vegetation bear a distinct similarity to the Arctic. Here the characteristic genera, and often species as well, are identical with those of the far north and exist only as highly localized relic colonies in their mountain refuges in New Hampshire. Below the alpine areas there are virgin stands of *Picea* and *Abies balsamea* of dwarf, weather-beaten character, amongst which in more open situations, can be found mats of *Vaccinium uliginosum, V. angustifolium, V. Vitis-idaea, Empetrum nigrum,*

etc. Man has seldom intentionally disturbed this "Hudsonian" type of vegetation and fires have mostly missed it as indicated by the great age of the scrubby trees. One virgin stand of full-sized trees of *Picea rubens* and *Abies balsamea* is still extant on the upper reaches of Nancy Brook covering 1,000 acres, and there is still a virgin area in the eastern part of Pittsburg which may, however, be lumbered within a few years. A much smaller stand consisting of 20 acres of primeval forest and known as the Pisgah tract is to be found in Winchester. This forest, consisting chiefly of *Tsuga* and *Pinus Strobus*, was blown down in 1938, but has not been logged.

At low elevations throughout the state there are acid bogs which are vegetational counterparts of the high mountains. As sources of peat and of gravels from their environs, bogs are vulnerable but thus far have been little affected by civilization. Mostly they harbor scattered and dwarfed trees of *Picea mariana* and *Larix laricina*, along with a dense growth of low heaths in a matrix of sphagnum.

River gravels offer an unstable footing for several species of *Salix* that are mostly confined to such places. *Salix interior*, in particular, is restricted to river gravels, along with *Prunus depressa*. Sand dunes along the coast similarly offer a continually shifting kind of habitat where certain characteristic shrubs occur, such as *Prunus maritima*, *Myrica pensylvanica*, and *Hudsonia tomentosa*. It is likely that both river gravels and dunes have changed but little in vegetation since the advent of the white man.

The only remaining habitats of woody plants that seem to have escaped destruction through the recent centuries are talus slopes with their scattered thickets of *Cornus rugosa*, *Rhus radicans*, and *Celastrus scandens*.

Historical accounts of the original forests are not numerous and contain inaccuracies, but do provide some clues as to the nature of the original forest in southern New Hampshire. The study of forest changes or successions going on now or which have taken place in recent time help us even more to draw reasonable inferences as to the nature of the characteristic virgin forest of each of the several floristic parts of the state. A very few protected stands of old, but not primeval forest, such as the "College Woods" in Durham, and several other small tracts scattered about in New Hampshire also provide a valuable point of reference to judge the changes going on so rapidly in managed forests and woodlots elsewhere in the state.

Proceeding from north to south we find that in the northern part of Coos County, from Jefferson and Milan northwards, on mountain slopes and flats, the dominant forest consisted of *Picea rubens*, *P. glauca*, and *Abies balsamea*. Some *Pinus Strobus* and other soft woods are mixed with these. Hardwoods, with *Fagus*, *Betula lutea*, and *Acer saccharum* predominating, were found on the intermediate slopes. Natural openings contained species less tolerant of shade, such as *Betula papyrifera*, *Prunus pensylvanica*, and *Pyrus americana*. The undergrowth consisted of shade-tolerant shrubs, such as *Taxus* and *Viburnum* species.

Below this, as far south as the southern limit of the area occupied by the higher of the White Mountains, on a line across the state through the middle of Carroll and most of Grafton counties, the forest was made up of varying mixtures of *Picea rubens*, *Pinus Strobus*, *Abies*, and hardwoods. *Picea glauca*, a more northern species, was lacking. *Quercus rubra* was scarce — the other oaks and hickories were non-existent. Individuals of *Pinus Strobus* were well distributed, but not found in pure stands as at

present. Some of these were 6 feet in diameter and 200 feet tall and were reserved for masts of the British navy. Some of these giants, marked according to tradition with the "king's broad arrow", may have persisted up to the turn of the century.

Jeremy Belknap, in his *History of New Hampshire* in 1792, described the forest somewhat to the south of the White Mountains as consisting of mixed hemlock-hardwood with huge white pines towering here and there above the other trees. *Quercus rubra* and *Q. alba, Betula lutea* and *B. lenta, Fagus, Fraxinus americana, Acer saccharum* and *A. rubrum* were dominant then as now, while in drier sites, *Castanea dentata* and *Carya ovata* were common. *Ulmus americana* was found in lowlands along streams and *Tilia americana* on rich slopes and in ravines.

Although most of the present forest must be considered in an unstable condition, proceeding by stages towards a climax, certain types can be recognized as common. On richer soils in the northern part of the state where cutting has not been extensive, the forest is often dominated by *Betula lutea, Fagus,* and *Acer saccharum,* with scattered *Fraxinus americana* and *Tilia americana.* On rather poor, dryish soils, *Populus* spp., *Betula papyrifera, Fagus, Acer saccharum,* and *Quercus rubra* are common. On low or swampy soils, *Acer rubrum, Fraxinus nigra,* and *Tsuga canadensis* are the most frequent trees. In Coos County, *Thuja* may be predominant in swampy areas. Old pastures revert to *Juniperus communis, Betula populifolia,* and almost pure stands of *Pinus Strobus.* On recently lumbered slopes and on lowlands in northern Coos County, *Betula papyrifera, Prunus pensylvanica,* and *Pyrus americana* grow in rapidly, with *Picea* and *Abies* coming in as an understory and eventually replacing them. On very sandy soils, especially after lumbering or fires, *Pinus rigida* and *Quercus ilicifolia* often are dominant particularly in central and southern New Hampshire.

In the southern part of the state the situation is different and more complex, with several species of *Quercus* and two of *Carya* being important trees. Swamps here may have *Nyssa sylvatica* or *Chamaecyparis thyoides, Acer rubrum, Rhus Vernix,* and many other species, some of northern affinity, along with the ubiquitous *Vaccinium corymbosum.* On warm slopes in southern New Hampshire, *Carya ovata, Ostrya virginiana,* and several species of *Quercus* occur with remnants of old trees of *Castanea* in the form of sprouts. Occasionally on such slopes, *Cornus florida, Sassafras, Rhus copallina,* and other species are found.

The Connecticut Valley has some calcareous outcroppings and supports a flora somewhat different from that of the rest of the state. This is reflected perhaps more in the herbaceous plants than in the woody ones; however, in the immediate vicinity of the Connecticut River, deciduous forest is dominant northward to the middle and upper portions of the Connecticut Valley, where *Thuja occidentalis* and *Picea glauca* make their appearance. *Rosa blanda* seems to be confined (except for one unverified station) to the valley. *Populus deltoides* and *Celtis occidentalis* also are restricted to the immediate environs of the Connecticut River, while *Carya cordiformis, Acer Negundo,* and *Ulmus rubra* occur in some abundance only in the Connecticut Valley. *Salix interior* is concentrated there on river gravels of islands (exceptionally on shores) from Plainfield southward to Walpole.

The Merrimack Valley also has a somewhat distinctive woody flora. Both *Quercus coccinea* and *Q. prinoides* are confined in New Hampshire to the lower part of the valley, and *Viburnum Rafinesquianum* is rather strikingly isolated in the townships of Derry and Windham, the usual range being much farther westward and southward in New England.

There are several other species of sandy, gravelly, or alluvial soils which are shared by eastern New Hampshire and the Merrimack River Valley, some outstanding examples being *Hudsonia ericoides, Betula nigra, Smilax rotundifolia,* and *Gaylussacia frondosa.*

In southeastern New Hampshire, *Iva frutescens* occurs in several scattered patches near tidewater, being here at the farthest northeastern stations in the United States. *Ilex glabra* is found in a very limited stand in Seabrook near the coast, the farthest north station for it in continental United States. *Carya glabra* and *C. cordiformis* reach their northeastern limits of range in southeastern New Hampshire. *Lindera Benzoin* and *Cornus florida,* both of which are of some abundance in parts of Strafford County, reach their northeastern limits of range nearby in York County, Maine. Though of more northern general range, *Gaylussacia dumosa* var. *Bigelviana* occurs locally only in the southeastern part of New Hampshire.

The foregoing discussion shows that, while clear-cut boundaries fail in many cases to delimit the ranges of species and associations of species, there are nevertheless certain areas of distinct climates, soils, and topographic features in New Hampshire which possess distinctive types of vegetation and flora.

There follows a brief history of botanical work in New Hampshire as it relates to floristic studies in general and to woody species in particular.

Beginning in 1784 with the visit of the botanist Manasseh Cutler to the White Mountains in company with Jeremy Belknap, there was at first intermittant and in more recent years almost continuous attention paid by botanists to the Presidential Range. The vast botanical collecting in the Presidential Range and the considerable work that has been carried on in other parts of Coos County were admirably summarized by Professor Pease in his *Vascular Flora of Coos County,* published in 1924 by the Boston Society of Natural History. The following list of botanical collectors is selected from Pease's much longer list (pp. 110-13) and is intended to show the powerful attraction of the area to botanists. The date of the initial visit of each is given. Any later visit is disregarded:

M. Cutler, 1784; J. Bigelow and F. Boott, 1816; T. Nuttall, 1824; W. Oakes, 1825; E. Tuckerman, 1837; H. D. Thoreau, 1839; W. Boott and A. Gray, 1842; D. C. Eaton, 1858; G. L. Goodale, 1859; H. Mann, 1862; N. Barrows, before 1871; W. F. Flint, 1871; C. E. Faxon, 1872; T. Morong, 1874; J. H. Huntington, 1876; C. G. Pringle, 1877; W. Deane, 1880; W. G. Farlow, 1882; C. F. Batchelder and C. H. Hitchcock, 1883; J. R. Churchill, 1889; G. G. Kennedy, 1890; E. F. Williams, 1893; A. S. Pease, 1895; E. D. Merrill, 1896; W. W. Eggleston, J. M. Greeman, and A. J. Grout, 1898; A. H. Moore, B. L. Robinson, and H. E. Sargent, 1901; A. S. Hitchcock, 1902; H. St. John, 1909; and M. L. Fernald, 1917.

In contrast to the extensive work accomplished in Coos County, the rest of the state has been dealt with floristically in a modest fashion or not at all. The earliest discussion of New Hampshire plants appeared in Jeremy Belknap's *History of New Hampshire,* volume III, pp. 96-127, in 1792.

The section was entitled, "Forest Trees and Other Vegetable Productions", and was written by Belknap with the acknowledged assistance of the botanists Manasseh Cutler and William D. Peck. Along with some general discussion of forests, there was a list of the principal kinds of trees known at that time in New Hampshire with some specific information about each.

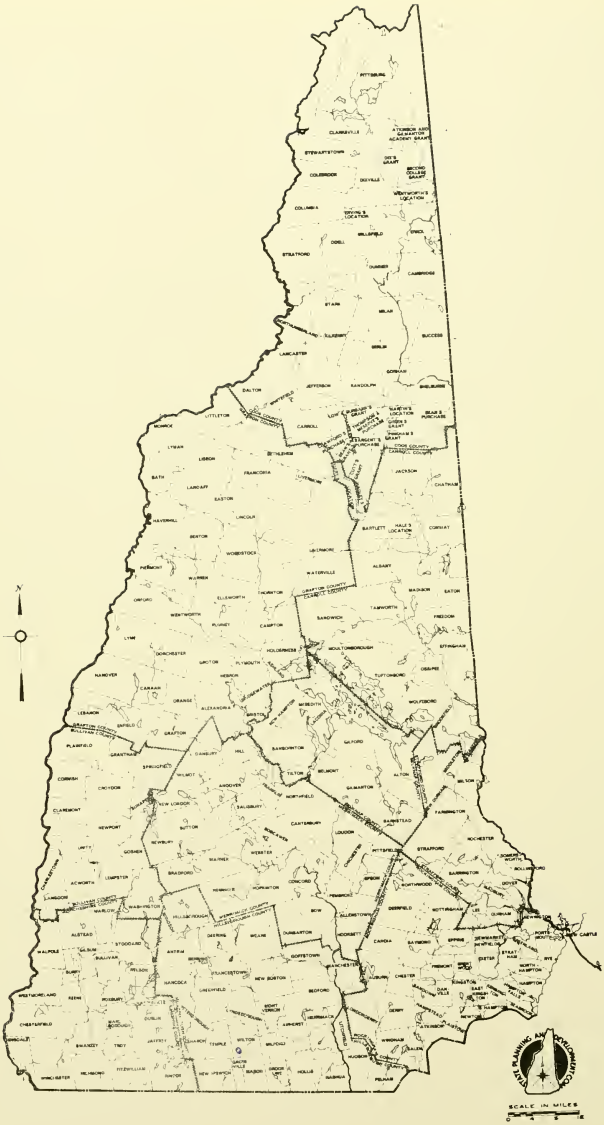
The only list of all the vascular plants of New Hampshire that has ever been attempted was by William F. Flint and appeared in C. H. Hitchcock's *Geology of New Hampshire*, pt. 1, 1874, pp. 381–445. A number of obvious errors in the stated occurrences of woody species are evident, but for the Connecticut Valley, at least, there are some interesting records. Flint's annotated list of "Trees and Shrubs Comprising the New Hampshire Forests" appeared in 1885 in the report of the first Forestry Commission with no striking emendations of the woody plants of his earlier list. John Foster's, *Trees and Shrubs of New Hampshire,* which first appeared in the Biennial Report of the State Forestry Commission for 1929-30 and which has been discussed earlier, has been the only other inclusive work on the woody plants of New Hampshire.

Several areas besides Coos County in the state have their local floras. For the Hanover region, Henry Griswold Jesup's first catalogue appeared in 1879. His final treatment, bearing the title *Flora and Fauna Within Thirty Miles of Hanover, New Hampshire,* was published in 1891. While hardly more than a list, there are occasional references to stations for certain more rare species, including some woody plants.

The Manchester area is covered botanically by Frederic W. Batchelder's *Preliminary List of Plants Growing Without Cultivation in the Vicinity of Manchester, New Hampshire*, which was published in 1900 in the Proceedings of the Manchester Institute of Science and by his complete revision of this same catalogue in 1909. Batchelder's study covered Hillsborough County, the western part of Rockingham County, and the southern part of Merrimack County. It has also been a valuable work of reference on the woody plants of the area covered. The only remaining flora to have embraced any considerable area was the *Flora of Strafford County, New Hampshire,* an M. S. thesis by A. R. Hodgdon in 1932. This relatively non-critical study pioneered in an entirely neglected and very promising part of the state. It now seems to be most important as having served as a basis for continuing investigation of the area up to the present time. Some of the specimens of Jesup and his collaborators are located at Dartmouth College, but many are present in the University of New Hampshire herbarium. The earlier Batchelder collections were burned, but those he collected later in life are present in the Manchester Institute of Arts and Science. Those of Hodgdon's Strafford County study are part of the collection at the University of New Hampshire.

There are many less ambitious works in our area, such as floras of townships. However, unless these are supported by collections, they are not very helpful except as careful descriptive information is provided which usually does not happen. In general, then, such unverifiable lists are omitted from this discussion.

A detailed floristic investigation of the Swift River Valley, covering parts of Albany, Waterville, and Livermore, by Martha Gale, resulted in an unpublished University of New Hampshire thesis in 1949 entitled "Vascular Flora of the Swift River Watershed in Grafton and Carroll Counties".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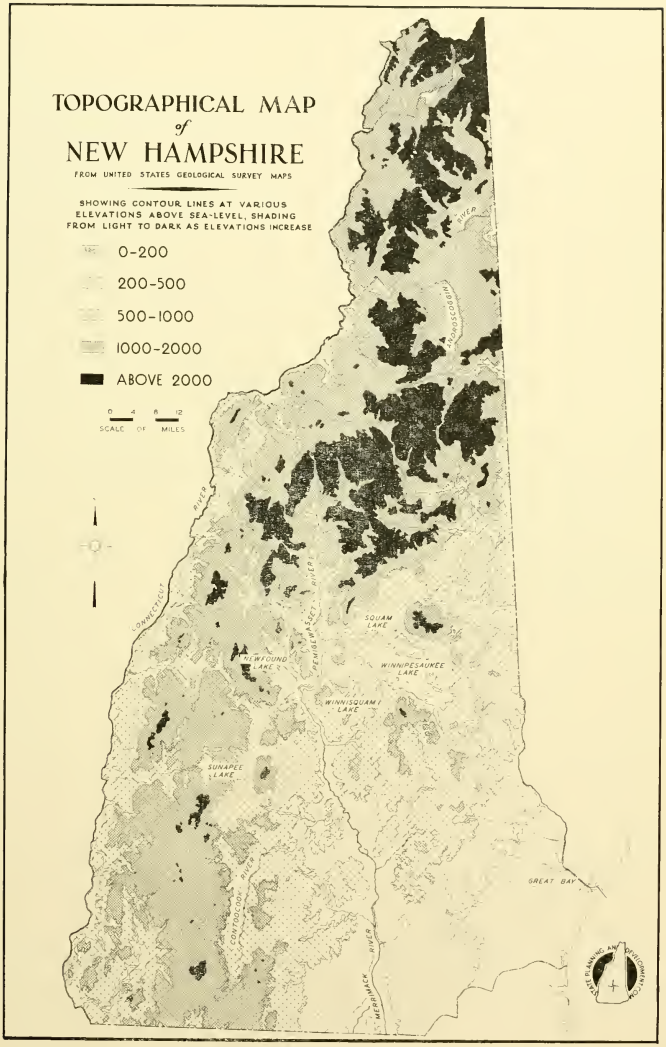
SCALE IN MILES


TOPOGRAPHICAL MAP
of
NEW HAMPSHIRE
FROM UNITED STATES GEOLOGICAL SURVEY MAPS
SHOWING CONTOUR LINES AT VARIOUS ELEVATIONS ABOVE SEA-LEVEL, SHADING FROM LIGHT TO DARK AS ELEVATIONS INCREASE
0-200
200-500
500-1000
1000-2000
ABOVE 2000
SCALE OF MILES
CONNECTICUT RIVER
AMMONOOSUC RIVER
PEMIGEWASSET RIVER
SQUAM LAKE
NEWFOUND LAKE
WINNIPESAUKEE LAKE
WINNISQUAM LAKE
SUNAPEE LAKE
CONTOOCOOK RIVER
MERRIMACK RIVER
GREAT BAY

Collections are deposited in the herbarium of the University of New Hampshire.

Two more local floras are worthy of mention to complete this discussion. The "Flora of Windham", which appeared in L. A. Morrison's *Supplement to the History of Windham in New Hampshire* in 1892, has recently been found to be supported by a nearly complete collection of specimens which are now on loan at the University of New Hampshire. Actually the collection includes 115 additional species which were not in the original list. These, including seven species of woody plants, were published as additions by A. R. Hodgdon and H. Friedlander in *Rhodora* 51:107-12, May 1949. A local flora covering a more limited area is *Flowering Plants and Ferns of the Fox Research Forest, Hillsboro, New Hampshire* by Alan A. Beetle, published by the New Hampshire Forestry and Recreation Department, Concord, in 1938. The collections are filed in the herbarium of the Fox Forest. C. A. Weatherby and S. F. Blake published some comments and corrections regarding this list in *Rhodora* 41:34-36, 1939.

Mention should be made of the fine herbarium collection which was prepared by the late Herbert Sargent for Wolfeboro and vicinity and which is currently housed at the Brewster Academy at Wolfeboro. Many interesting new stations, some of them of woody species, were discovered by Sargent and his students.

The herbarium of Frederic Steele at Tamworth emphasizes Carroll County, but has a selection of woody plants from other areas and contains a considerable percentage of rarities, and of specimens which were needed to complete the county lists for our present study.

Finally mention should be made of a collection of Farmington plants made by Charles W. T. Willson which was given to the University of New Hampshire herbarium some years ago.

	Co*	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Taxus canadensis	x	x	x	x	x	x	x	x	x	x
Abies balsamea var. balsamea	x	x	x	x	s	x	s	x	x	x
var. phanerolepis	x	x	x							
Tsuga canadensis	x	x	x	x	s	x	s	x	x	x
Picea glauca	x		x							
P. abies		i	i							
P. rubens	x	x	x	x	x	x	x	x	x	x
P. mariana	x	x	x	x	s	x	x	x	x	x
Larix laricina	x	x	x	x	x	x	x	x	x	x
L. decidua			i	i						
Pinus Strobus	x	x	x	x	s	x	x	x	x	x
P. resinosa	x	x	x	x	x	x	x	x	x	x
P. sylvestris	i	i	i	i						
P. rigida	x	x	x	x	x	x	x	x	x	x
P. Banksiana	x	x	x							
Thuja occidentalis	x	i	x		i		i	i	i	
Chamaecyparis thyoides				x		x		x	x	x
Juniperus communis var. communis						x	x		x	x
var. depressa	x	x	x	x	x	x	x	x	x	x
var. saxatilis	x									
J. virginiana var. crebra		x	x	x	x	x	x	x	x	x
Smilax rotundifolia				x				x	x	
Salix nigra	x	x	x	x	x	x	x	x	x	x
S. pentandra		i	i			i				
S. lucida var. lucida	x	x	x	x	x	x	x	x	x	x
var. angustifolia	x	x								
var. intonsa	x	x								
S. fragilis	i			i		i				
S. alba var. alba				i					i	i
var. vitellina	i	i	i	i	i		i		i	i
var. calva		i		i	i	i		i		

x=collection; s=observed; i=introduced.

*County abbreviations: Co., Coos; Ca., Carroll; Gr., Grafton; St., Strafford; Be., Belknap; Me., Merrimack; Su., Sullivan; Ro., Rockingham; Hi., Hillsboro; Ch., Cheshire.

Taxus canadensis Marsh. American Yew, Ground Hemlock.

Common and of general occurrence in moist, often rich areas, swampy woods, ravines, and near streams at low and medium elevations up to 2,500 feet, becoming less abundant southward.

Abies balsamea (L.) Mill. var. **balsamea** Balsam-Fir.

A climax tree of the White Mountains and lowlands in northern Coos County, confined to cool woods in other parts of state: in the alpine zone of the Presidential Range, forma *hudsonia* (Jacques) Fern. and Weatherby occurs as a depressed state of the species.

Var. **phanerolepis** Fern.

Tends to replace the species on the higher parts of the mountains, occasionally descending to low elevations; frequent in Coos, Grafton, and northern Carroll Counties.

Tsuga canadensis (L.) Carr. Hemlock.

Formerly a climax dominant of forests south of White Mountains at low elevations; common at present in central and southern New Hampshire, becoming infrequent in Coos County; observed at 2,400-feet elevation on Mt. Chocorua in Albany; most luxuriant on moist slopes and in ravines.

Picea glauca (Moench.) Voss. White Spruce.

Common as a climax dominant north of Presidential Range and somewhat abundant in upper Connecticut Valley, as far south as Littleton, absent from rest of state; outlying station in Warren; often planted elsewhere but not spreading.

P. abies (L.) Karst. Norway Spruce.

Often planted, occasional seedlings persisting for some time; introduced from Europe.

P. rubens Sarg. Red Spruce.

A climax dominant in mountains at medium elevations throughout state and at lower elevations north of Presidential Range; common in Grafton and Carroll counties, southward only occasional, occurring rather generally above 1,000-feet elevation; often on poorer soils; depressed specimen seen at 5,000 feet on Mt. Washington.

P. mariana (Mill.) BSP. Black Spruce.

Throughout state; near tops of some of lower mountains and above tree-line in Presidential and Franconia ranges; generally occurring in lowland bogs and around bog-ponds: The depressed forma *semiprostrata* (Peck) Blake occurs in mats in the alpine areas of the White Mountains.

Larix laricina (DuRoi) K. Koch. American Larch, Tamarack, Hackmatack.

At or near tree-line on Presidential and Franconia ranges, where occasional; common in poorly drained areas in northern New Hampshire at low elevations; becoming sporadic southward; less common than black spruce in southern part of state; in alpine area of Presidential Range forma *depressa* Rousseau occurs sparingly as prostrate individuals.

L. decidua Mill. European Larch.

Escaped near planted trees in Strafford County, apparently spreading locally; introduced from Europe.

Finus Strobus L. White Pine.

Throughout state; abundant old-field tree over much of New Hampshire at low elevations; less common in climax forests but tending to perpetuate itself in drier sites. Our largest tree; numerous records of trees more than 200 feet tall exist; occasional specimens occur above 3,000-feet elevation in mountains: Rhodora, 51:393-394, 1949.

P. resinosa Ait. Red or Norway Pine.

Frequent but scattered throughout state at low elevation except in Coos County, where rare; stations at about 2,500 feet occur on exposed mountain slopes; occasionally dominant in sandy soil and on ledges: forma *globosa* Rehder of dwarf dense growth and rounded form was discovered in Wolfeboro, Carroll County the type locality: Journal Arnold Arb. 3:41, 1922.

P. sylvestris L. Scotch Pine.

Often planted in earlier times for reforestation purposes and definitely spreading in several localities; not likely to persist long in competition with native species; introduced from Europe.

P. rigida Mill. Pitch Pine.

Common on dry rocky slopes and sandy areas at low elevations north to Presidential Range; outlying colony at Shelburne; often occurs in burned-over areas since it survives severe fires.

P. **Banksiana** Lamb. Gray or Jack-Pine.

A rare tree in New Hampshire known only from the following localities: namely Mt. Chocorua, Welch Mountain, Mt. Webster, and vicinity of Lake Umbagog; all of New Hampshire stations are on ledges: Rhodora 56:204, 1954.

Thuja occidentalis L. Arbor Vitae, Northern White Cedar.

Common in swamps in Coos County, north of Presidential Range, and chiefly on slopes in Grafton County, in vicinity of Connecticut River, south to Orford; outlying station in Lincoln; confined mostly to calcareous soil; abundantly cultivated and occasionally spreading elsewhere.

Chamaecyparis thyoides (L.) BSP. Southern White Cedar.

Frequent in swampy woods near the coast in Rockingham County, elsewhere confined to southern part of state where strongly localized; most isolated areas are in Winchester, E. Washington, Bradford, Windsor, Hancock, and New Durham: Rhodora 31:96-98, 1929.

Juniperus communis L. var. **communis.** Common Juniper.

This very distinct erect state of the juniper is occasional to locally abundant in southern New Hampshire where it hybridizes with var. *depressa;* erect specimens have been collected in Wilmot, Francestown, Pelham, Claremont, Jaffrey; specimens from Sandown, Strafford, Bennington, and Meredith are not entirely typical.

Var. **depressa** Pursh. Ground-Juniper.

Widely distributed in New Hampshire at low elevations, abundant north to the White Mountains, quite localized north of Presidential Range; dominant in early pasture successions; more permanent habitat is ledges.

Var. **saxatilis** Pallas.

One specimen of this dwarfed alpine taxon has been collected from the cone of Mt. Washington: Rhodora 58:50, 1956.

J. virginiana L. var. **creba** Fern. and Grisc. Red Cedar.

Common in southeastern New Hampshire, where often the dominant old-field tree near coast; local inland; reaching northern limits in Piermont and Bartlett; dry open situations, occasionally on cliffs; Rhodora 56:204, 1954.

Smilax rotundifolia L. Greenbrier, Catbrier.

Southern species, confined to southeastern New Hampshire, most abundant near the coast; along shores, banks of streams and edges of swamps, and in thickets.

Salix, a large genus, the native species numerous and mostly shrubs, frequently exhibiting polyploidy and hybridizing freely, producing progeny often difficult or impossible to identify with certainty, such hybrids often persisting and spreading vegetatively and in some cases reproducing apomictically; the principal local group of woody plants to persist and spread in river-gravels.

S. nigra Marsh. Black Willow.

Widely distributed shrub or low tree; moderately abundant in central and southern parts of New Hampshire, at low elevations; occurs sparingly and only in stream valleys north of Presidential Range, elsewhere in swamps or along streams; may hybridize in our area with *S. lucida, S. interior* and *S. alba.*

S. pentandra L. Bay-leaved Willow.

An occasional escape, mostly in the vicinity of planted specimens, in central and northern New Hampshire; introduced from Europe.

S. lucida Muhl. var. **lucida.** Shining Willow.

Of general occurrence, common in northern half of state, infrequent southward; river-gravels, wet places at low elevations; may hybridize with *S. alba* and *S. nigra.*

Var. **angustifolia** Anderss.

Of northern distribution, not common; mostly in Coos County, occurs also in Carroll County; of similar habitats, but not to be confused with stunted specimens of var. *lucida.*

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
S. interior							x			x
S. herbacea	x		x							
XS. Peasei	x									
S. Uva-ursi	x		x							
S. argyrocarpa	x									
XS. Grayi	x									
S. pyrifolia	x	x	x							
S. cordata var. abrasa							x			
S. rigida var. rigida	x	x	x	x	x	x	x	x	x	x
var. angustata	x	x	x		x					
XS. myricoides	x	x			x				x	
S. Bebbiana	x	x	x	x	x	x	x	x	x	x
S. pedicellaris var. hypoglauca	x	x			x					
var. tenuescens	x	x								
S. discolor var. discolor	x	x	x	x	x	x	x	x	x	x
var. latifolia	x	x	x	x		x	x			
S. humilis var. humilis	x	x	x	x	x	x	x	x	x	x
var. keweenawensis	x		x							
var. microphylla									x	
S. gracilis var. gracilis	x			x						
var. textoris	x	x	x	x	x	x	x	x	x	x
S. sericea	x	x	x	x	x	x	x	x	x	x
S. planifolia	x									
S. pellita	x									x
S. viminalis	i									
S purpurea	i		i	i				i		
Populus tremuloides var. tremuloides	x	x	x	x	s	x	x	x	x	x
var. magnifica	x	x								
P. grandidentata	x	x	x	x	s	x	x	x	x	x
P. alba	i	i	i	i			i			

Var. **intonsa** Fern.

Mostly in Coos County, occurs also in Carroll County; of similar habitats.

S. fragilis L. Crack-Willow.

Often planted; sometimes an escape: introduced from Europe.

S. alba L. var. **alba.** White Willow.

The common naturalized tree-willow of New England is *S. alba* from Europe; the least common of the varieties is the typical var. *alba*, with a few widely separated stations in southern New Hampshire: *S. alba* and its varieties may hybridize with *S. nigra*, *S. lucida*, and *S. gracilis*.

Var. **calva** G. F. W. Mey.

Of scattered distribution, locally common, chiefly in very wet areas.

Var. **vitellina** (L.) Stokes.

The most abundant of the local varieties, occurring throughout at low elevations in similar situations.

S. interior Rowlee. Sandbar-Willow.

River-gravels and sands near high-water mark; of limited distribution in New Hampshire mostly confined to islands in the lower Connecticut River; known stations for the typical glabrous extreme occur north to Plainfield: forma *Wheeleri* (Rowlee) Rouleau with leaves more or less permanently silvery-silky, is found on the shores at Walpole and Plainfield; hybrids with *S. nigra* and probably with *S. rigida* were noted on islands in Plainfield.

S. herbacea L.

Infrequent; confined to the heads of ravines and wetter alpine areas on the Presidential Range and of limited occurrence in the Franconia Range (Mt. Lincoln).

X. S. Peasei Fern.

A hybrid of *S. herbacea* and *S. Uva-ursi*, confined to upper parts of King's Ravine on Mt. Adams; limited colony still surviving since discovery in 1909: Rhodora 19:221-223, 1917.

S. Uva-ursi Pursh.

Abundant in moist as well as drier alpine areas and open ravines of Presidential and Franconia ranges; local on exposed slope on southern part of Twin Range: forma *lasiophylla* Fern. with leaves pilose above has been collected on Mt. Lincoln: Rhodora 18:52, 1916.

S. argyrocarpa Anderss.

Frequent in springy places and along brooks in alpine areas and ravines of Presidential Range.

X. S. Grayi Schn.

A hybrid of *S. argyrocarpa* and *S. planifolia* occurs in Tuckerman and Ammonoosuc Ravines.

S. pyrifolia Anderss. Balsam-Willow.

Frequent in moist places; in northern New Hampshire mostly at low and medium altitudes but sometimes in subalpine areas south to Benton and Hart's Location: may hybridize with *S. discolor*: Rhodora 14:69-70, 1912.

S. cordata Michx. var. **abrasa** Fern.

Collections fitting this taxon have been made in 1955 and 1956 from a single spreading clump 2-3 feet tall at Sumner's Falls in Plainfield.

S. rigida Muhl. var. **rigida.**

Common in river-gravels and other moist habitats at low elevations; of general distribution in our area, less common in open areas at medium elevations up to 4,000 feet: forma *mollis* (Palmer and Steyerm.) Fern. with petioles and branchlets pubescent is less common but of rather general distribution: *S. rigida* may hybridize in our area with *S. Bebbiana, S. discolor, S. gracilis, S. sericea*, and *S. pedicellaris.*

Var. **angustata** (Pursh.) Fern.

Is generally more northern than the typical and much less common.

X. S. myricoides (Muhl.) Carey.

This hybrid of *S. rigida* and *S. sericea* is the most commonly encountered of the many hybrids of *S. rigida* with other species; to be expected wherever the two species grow in close proximity.

S. Bebbiana Sarg. Long-beaked Willow.

An abundant willow of general distribution, at lower elevations, in both moist and dry situations; ascending the mountains to 4,000 feet: hybridizing with *S. rigida, S. discolor, S. humilis*, and *S. gracilis*, producing a confusion of progeny very few of which have been collected in New Hampshire and named as to parentage.

S. pedicellaris Pursh. var. **hypoglauca** Fern.

The typical variety with leaves green beneath is not reported from New Hampshire; var. *hypoglauca* is scattered in northern and east central New Hampshire with outlying station in Hollis; may be expected throughout; open swamps at low elevations: may hybridize with *S. rigida.*

Var. **tenuescens** Fern.

Has been reported only from Randolph and Tamworth in New Hampshire; it intergrades with var. *hypoglauca;* both are found with other willows in wet meadows and swamps.

S. discolor Muhl. Large Pussy-Willow.

Abundant and generally distributed species of moist thickets and along roadsides at low elevations, occasionally ascending to 4,000 feet: this and the next are the earliest willows to flower; frequently hybridizing with the following common species, *S. rigida, S. humilis, S. Bebbiana,* and *S. gracilis;* hybrids of *S. discolor* and *S. humilis* may be related to or confused with the next.

Var. **latifolia** Anderss.

A somewhat variable taxon, occurring occasionally with the species in similar habitats.

S. humilis Marsh. var. **humilis** Small Pussy-Willow.

Frequent and of general distribution at lower elevations, ascending to 2,000 feet, often in dry situations; hybridizes with *S. Bebbiana, S. discolor, S. gracilis,* and *S. sericea.*

Var. **keweenawensis** Farw.

Several stations in Coos and Grafton counties.

Var. **microphylla** (Anderss.) Fern.

Usually quite distinct from var. *humilis*: barely gets into New Hampshire from the south; there are collections of it from Nashua, Merrimack, and Pelham, in sandy areas.

S. gracilis Anderss. var. **gracilis.**

At low altitudes; has been collected chiefly from north of the Presidential Range in New Hampshire with outlying station in Lee; to be expected throughout.

Var. **textoris** Fern.

Quite distinct from typical *S. gracilis;* generally distributed and frequent at low elevations, in swamps and along water-courses: hybridizes with *S. rigida, S. Bebbiana, S. discolor, S. humilis, S. sericea,* and *S. alba.*

S. sericea Marsh. Silky Willow.

A common and generally distributed willow at low altitudes, in swamps, along streams and in river-gravels in wet situations; occasionally ascends to 4,000 feet; crosses freely with *S. rigida, S. humilis,* and *S. gracilis.*

S. planifolia Pursh.

Confined to the Presidential Range; along brooks and in wet meadows in the alpine-area and in moist heads of ravines.

S. pellita Anderss.

Stream-banks and wet thickets in Androscoggin and Connecticut river valleys; confined to Coos County except for single station far to southwest in Marlow: forma *psila* Schneid., with leaves glabrescent beneath has been collected in Wentworth Location.

S. purpurea L. Purple Osier, Basket-Willow.

Occasional escape throughout, well established in Dover: introduced from Europe.

Populus tremuloides Michx. var. **tremulcides** Quaking or Trembling Aspen.

Common and wide ranging tree at low elevations ascending to 3,200 feet; in dry woods, disturbed forest, and old fields: forma *reniformis* Tidestr., with kidney-shaped leaves has been collected in Tamworth and is probably occasional throughout; a rare form, with narrower heart-shaped leaves, has been collected in Lee.

Var. **magnifica** Vict.

Perhaps of pathological origin, is occasional in New Hampshire.

P. grandidentata Michx. Large-toothed Aspen.

Generally distributed and common at low elevations ascending to 2,500 feet; most common in recent woods or burned areas, occasional in older, more mature forests.

P. alba L. White Poplar.

Persisting and spreading clonally following early cultivation; locally abundant throughout: naturalized from Europe.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
P. deltoides	i		x	i			x		i	x
P. nigra var. italica		i	i	i					i	
P. balsamifera var. balsamifera	x	x	x				x			
var. subcordata	x						x			x
XP. gileadensis	i		i	i	i		i			i
Myrica Gale var. Gale	x	x	x	x	x	x	x	x	x	x
var. subglabra	x	x	x	x	x	x	x	x	x	x
M. pensylvanica				x	x			x	x	
Comptonia peregrina	x	x	x	x	x	x	x	x	x	x
Juglans cinerea	x	x	x	x	x	x	x	x	x	x
Carya cordiformis			x	x			x	x	x	x
C. ovata var. ovata		i		x	x		x	x	x	x
var. Nuttallii								x		
var. pubescens				x						
C. glabra				x				x		
C. ovalis				x				x	x	x
Corylus americana		x	x	x	x	x	x	x	x	x
C. cornuta	x	x	x	x	x	x	x	x	x	x
Ostrya virginiana	x	x	x	x	x	x	x	x	x	x
Carpinus caroliniana		x	x	x		x	x	x	x	x
Betula lenta		x	x	x	x	x	x	x	x	x
B. lutea var. lutea	x	x	x	x	x	x	x	x	x	x
var. macrolepis	x	x	x			x			x	
B. nigra				x				s	x	
B. populifolia	x	x	x	x	x	x	x	x	x	x
B. caerulea - grandis	x		i							
B. minor	x		x							
B. papyrifera var. papyrifera	x	x	x	x	x	x	x	x	x	x
var. cordifolia	x	x	x		x	x				

P. deltoides Marsh. Cottonwood, Necklace-Poplar.

Doubtless indigenous in Connecticut Valley where of frequent occurrence as far north as Haverhill; tree 5 feet in diameter was reported in 1901 at Walpole; perhaps escaped in Shelburne and Hudson, and certainly introduced in Lee; river-gravels and banks.

P. nigra L. Lombardy Poplar.

The Lombardy Poplar, the so-called var. *italica*, is a cultivar or form of this species which persists or spreads in central and southern New Hampshire following cultivation; susceptible to disease and often dying out: introduced from southern Europe or western Asia.

P. balsamifera L. var. **balsamifera** Balsam-Poplar, Hackmatack, Taccamahac.

Stream-banks, river-gravels, and low ground; frequent in Coos County, extending locally southward to central Carroll, Grafton, and Sullivan counties.

Var. **subcordata** Hylander.

Apparently not common; collections have been made in and near the Connecticut Valley in Columbia, Plainfield, and Walpole.

X. P. gileadensis Rouleau. Balm-of-Gilead.

Formerly much cultivated, this asexually spreading presumed hybrid of *P. deltoides* and *P. balsamifera* is widespread as an adventive.

Myrica Gale L. var. **Gale.** Sweet Gale.

The two varieties of *M. Gale* occur throughout at low elevations; they tend to intergrade freely in our material as to degree of pubescence, thus making it difficult to classify many of the New Hampshire specimens; the pubescent-leaved var. *Gale* is Eurasian and more northern in North America; the preponderance of Coos County specimens belong to it.

Var. **subglabra** (Chev.) Fern.

Of slightly more southern distribution, the var. *subglabra* is strictly of eastern North America; frequent in Coos County and about as common as var. *Gale* in central and southern New Hampshire; both varieties occur along shores of ponds and in bogs.

M. pensylvanica Loisel. Bayberry.

Abundant shrub of coast, occasional inland, most outlying stations are Mason and Alton; sands, rocky areas, and banks.

Comptonia peregrina (L.) Coult. Sweet-fern.

Common and generally distributed at low elevations as far north as Milan in Coos County; dry sandy or sterile areas.

Juglans cinerea L. Butternut.

Of general distribution, locally common at low elevations; probably originally introduced over much of New Hampshire, often along roads and near houses or cellars; indigenous when growing under forest conditions in Connecticut Valley and perhaps indigenous in other parts of New Hampshire.

Carya cordiformis (Wang.) Koch. Bitternut.

Southern species, extending north in Connecticut Valley, where frequent, to Lebanon, and north in Merrimack Valley to Hollis (rare) and into some of the townships bordering Great Bay (occasional); banks and rocky slopes: Rhodora 48:206, 1946.

C. ovata (Mill.) Koch. var. **ovata.** Shagbark-Hickory.

Mostly absent as a forest tree from central New Hampshire, but occasionally planted; common in forests in southern parts of state at low elevations in dry, rich woods; strongly encouraged along roads or near houses for the edible nuts.

Var. **Nuttallii** Sarg.

Small-fruited state, mostly southern in distribution; specimens from Derry and Mason have been so-called; considering the very great differences in sizes and shapes of nuts of *C. ovata* there might be some question as to the advisability of naming one particular variant such as this.

Var. **pubescens** Sarg.

Specimen from Strafford County.

The pignuts of Gray's Manual ed. 8 include two species, *C. glabra* (Mill.) Sweet and *C. ovalis* (Wang.) Sarg. The rather abundant pignuts of the Great Bay area in Strafford and Rockingham counties possess a high degree of genetic diversity, often combining traits of both so-called species in one individual as was pointed out by Hodgdon and Gangi, Rhodora 51:150-152, 1949. It would probably be wiser to treat this population as one species because of the free gene exchange between its members. However, to conform to Gray's Manual we will here recognize

the extremes, based on fruit-characteristics, as *C. glabra* and *C. ovalis*. It should be pointed out that Manning, Rhodora 52:191, 1950, stated that he was unable to separate these species except with completely mature fruit: because of the excessive variability of *C. ovalis* we consider it inadvisable to recognize any of its so-called varieties in New Hampshire.

C. glabra (Mill.) Sweet Pignut.

Warm, dry and often rocky slopes, Durham, Strafford County, and Newmarket, Rockingham County, and probably elsewhere in southern New Hampshire; local and much less common than the next.

C. ovalis (Wang.) Sarg. Sweet Pignut.

Southern Strafford and central and southern Rockingham counties; warm, dry and often rocky slopes; also in some profusion in southeastern Hillsboro and southwestern Cheshire counties.

Corylus americana Watts. American Hazelnut.

At low elevations in central and southern New Hampshire reaching north to Haverhill and Ossipee; of somewhat scattered distribution, common southward; thickets in both dry and moist situations: forma *missouriensis* (A. D. C.) Fern., with glandless twigs, petioles, and involucres is less common but occasional.

C. cornuta Marsh. Beaked Hazelnut.

Widely distributed and common throughout in well drained sites; thickets, roadsides and open woods at low elevations occasionally ascending to 3,000 feet; specimen from Keene with few bristles approaches forma *inermis* Fernald.

Ostrya virginiana (Mill.) Koch. Hop-Hornbeam, Ironwood.

Frequent and widely distributed at low elevations throughout; rich, often rocky, warm slopes: forma *glandulosa* (Spach.) Macbr., with branchlets bearing glands, occurs throughout our range.

Carpinus caroliniana Walt. var. **virginiana** (Marsh.) Fern. American Hornbeam, Blue Beech, Ironwood.

Locally common in swamps and low, rich woods in southern New Hampshire; infrequent in central New Hampshire; north to Bath in Connecticut Valley, Canterbury in Merrimack Valley and Wolfeboro in eastern New Hampshire.

Betula lenta L. Black, Cherry-or Sweet Birch.

Common forest tree of good soils at low elevations in southern and south central New Hampshire, north to Hanover in Connecticut Valley and to Tamworth in eastern New Hampshire: Rhodora 13:206-207, 1911: forma *laciniata* Rehder with deeply cut leaves was described from a specimen collected in New Boston: Rhodora 4:83-84, 1902, and 9:111, 1907.

B. lutea Michx f. var. **lutea**. Yellow Birch.

Common and of wide distribution; climax-species of moist, cool forest up to 2,000-feet elevation; occasionally occurring to 3,000 feet: forma *fallax* Fassett, having close bark, has been collected in Albany.

Var. **macrolepis** Fern.

Of scattered distribution in northern and central parts of the state; outlying station in Manchester; less common than the typical, but associated with it and freely intergrading.

B. nigra L. River-or Red Birch.

Southern species locally abundant in Merrimack Valley, extending north to Beaver Brook in Pelham; limited colony also on southeastern shore of Mendum's Pond, Barrington, at northeastern known limit of range: said also to be found on an island in Pawtuckaway Lake; Barrington colony much expanded in recent years: Rhodora 37:414, 1935.

B. populifolia Marsh. Gray Birch.

Generally distributed small tree of poor soil; abundant north to White Mountains, diminishing northward; abundant in old fields and pastures reverting to forest, also occasional in bogs and in rocky scrub-forests of exposed slopes and summits up to 3,000 feet; hybridizes with *B. papyrifera.*

B. caerulea-grandis Blanch. Blue Birch.

Specimens have been collected in northern New Hampshire in Shelburne, Randolph, and Franconia; the taxon has been suggested as of hybrid origin; polyploidy is known to occur in *Betula* and may be a complicating factor.

B. minor (Tuckerm.) Fern. Dwarf White Birch.

Frequent in alpine areas and heads of ravines of Presidential and Franconia ranges: hybridizes with *B. glandulosa.*

B. papyrifera Marsh. var. **papyrifera.** Paper-or Canoe-Birch.

The state tree of New Hampshire: common forest-tree throughout at low and medium altitudes; cool woods and slopes; often replaced at higher altitudes by the variety *cordifolia.*

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
B. glandulosa	x	x								
Alnus crispa var. crispa	x	x	x							
var. mollis	x	x	x	x		x	x	x	x	x
A. rugosa var. rugosa		x	x	x	x	x	x	x	x	x
var. americana	x	x	x	x	x	x	x	x	x	x
A. serrulata var. serrulata		x	x	x	x	x	x	x	x	x
var. subelliptica		x		x				x	x	
Fagus grandifolia	x	x	x	x	x	x	x	x	x	x
Castanea dentata		x	x	x	x	x	x	x	x	x
Quercus alba		x	x	x	x	x	x	x	x	x
Q. robur										i
Q macrocarpa					x					
Q bicolor				x		x		x	x	
Q. prinoides						x		x	x	x
Q. Prinus								x	x	x
Q rubra var. rubra	x	x	x	x	x	x	x	x	x	x
var. borealis	x	x	x	x				x	x	x
Q. coccinea									x	
Q. velutina				x	x	x	x	x	x	x
Q. ilicifolia		x		x	x	x	x	x	x	x
Ulmus rubra		i	x				x		x	x
U. americana	x	x	x	x	x	x	x	x	x	x
Celtis occidentalis var. pumila							x			x
Morus alba		i		i		i	i			
Clematis virginiana	x	x	x	x	s	x	x	x	x	x
C. verticillaris	x	x	x	x	x	x		x		
Berberis vulgaris	i	i	i	i	i	i	i	i	i	i
B. Thunbergii	i	i	i	i	i		i		i	i
Sassafras albidum var. albidum		x		x		x		x	x	x
var. molle				x				x	x	x

Var. **cordifolia** (Regel.) Fern.

Mostly on upper forested slopes of mountains and in subalpine areas of Presidential Range, also in cool ravines and on ledges at low elevations; hybrids between *B. populifolia* and *B. papyrifera* or *B. papyrifera* var. *cordifolia* have been collected on Mt. Paugus in Albany, and summit of Pack Monadnock in Peterborough.

B. glandulosa Michx. Dwarf Birch.

Mostly confined to alpine areas of Presidential Range; one station in Jackson, Carroll Co., at 1,600-ft. elevation: Rhodora 48:183, 1946; hybridizes with *B. minor.*

Alnus crispa (Ait.) Pursh var. **crispa.** Green or Mountain-Alder.

Confined to White Mountain area; common in gullies and moist slopes in subalpine areas of higher mountains, occasional on lower mountains, and in valleys in northern New Hampshire: forma *stragula* Fernald of dwarf character has been found on Mt. Washington and exposed slope of Mt. Bond.

Var. **mollis** Fern.

Freely intergrading with the typical; common in the general area of White Mountains from subalpine parts of Presidential Range (rare), to lower mountains, and foothills; occasional in rest of state; ledges, stream-gravels, bushy flats and along the coast.

The *Alnus rugosa* complex of swamps and low grounds is highly diverse in central and southern New Hampshire; in addition to frequent intraspecific crossing between the varieties and forms of *A. rugosa* there are frequent intergradations between *A. serrulata* var. *subelliptica* and *A. rugosa* var. *rugosa.*

A. rugosa (DuRoi) Spreng. var. **rugosa.** Speckled Alder.

The vars. of *A. rugosa* occur in swamps and along streams at low elevations; var. *rugosa* is mostly confined to and often frequent in southern half of state, reaching Haverhill in Connecticut Valley and Madison in central New Hampshire: forma *Emersoniana* Fernald with leaves pubescent beneath is about as common as the glabrous phase.

Var. **americana** (Regel.) Fern.

The northern variety occurring in the northern half of New Hampshire nearly or quite to the exclusion of var. *rugosa* and often predominating also in the southern part: in early development or in unfavorable situations easily confused with var. *rugosa*: forma *hypomalaca* Fernald, with leaves pubescent beneath, occupies the same range and is about as common: collections approaching forma *tomophylla* Fern. with deeply indented leaves have been made in Colebrook and Pittsburg.

A. serrulata (Ait.) Willd var. **serrulata.** Common Alder.

Common in southern and south central New Hampshire extending north to Madison, Holderness, and Claremont; shores of ponds, along streams, and in swamps: forma *novaboracensis* (Britt.) Fern. with leaves pubescent beneath is occasional.

Var. **subelliptica** Fern.

Less common than typical and often growing with it but more southern in range, occurring north to Tamworth: forma *mollescens* Fern. with leaves pubescent beneath is known from Merrimack and is probably found elsewhere.

Fagus grandifolia Ehrh. Beech.

Widespread climax tree throughout at middle and low elevations up to 2,500 feet; chiefly of rich soils; probably consists of several varieties not yet clearly elucidated taxonomically: forma *pubescens* Fern. & Rehd. with leaves short pubescent beneath and villous on the veins is occasional in southern New Hampshire.

Castanea dentata (Marsh.) Borkh. Chestnut.

Apparently no large trees now remain of the once extensive chestnut-forests that covered ridges and slopes in southern and south central New Hampshire at low elevations, extending north to Alton, Center Harbor, and Hanover; sprouts are fruiting extensively, and apparently disease-free seedling-chestnuts are occasionally met with; formerly cultivated outside of natural range.

Quercus alba L. White Oak.

Mostly in dry woods but occasionally in more moist and rich areas, common at low elevations, extends north to Plymouth and Sandwich in central New Hampshire, Bath in Connecticut Valley and Moultonborough and Madison in east central New Hampshire; the following forms may occur: forma *viridis* Trel., with leaves green beneath is occasional; forma *latiloba* (Sarg.) Palmer & Steyermark with leaves cut less than halfway to midrib is common; forma *repanda* (Michx.) Trel. with broad lobes and shallow sinuses probably is here but no specimens have been seen from New Hampshire; typical *Q. alba* with deeply cut leaves is common: *Q. alba* may hybridize with *Q. bicolor, Q. prinoides,* and *Q. Prinus,* but no specimens are known from New Hampshire.

Q. robur L. English Oak.

Rare escape, Rindge: introduced from Europe.

Q. macrocarpa Michx. Mossy-cup Oak.

Specimens at Hall's Hill, Gilmanton (Hodgdon & Leighton) on slope above stream have the characteristic foliage of this species but, lacking fruits, may prove to be aberrant *Q. bicolor.*

Q. bicolor Willd. Swamp-White Oak.

Sporadic and restricted to the southeastern part of New Hampshire west to Manchester, Hooksett, and Nashua and northeast to Durham, in swamps and along stream-margins. (The above mentioned specimen of "*Q. macrocarpa*", if eventually shown to be *Q. bicolor,* would considerably extend the range northward in New Hampshire.)

Q. prinoides Willd. Dwarf Chestnut-Oak.

In dry, sandy areas in southern New Hampshire; common in lower Merrimack Valley north to Hooksett and eastward in southern Rockingham County to Derry; occurs also in Walpole in Connecticut Valley.

Q. Prinus L. Chestnut-Oak.

Dry, warm slopes in acid soils, mostly in extreme southern New Hampshire from Winchester to Hudson; most northerly stations in Manchester, Nottingham, and Newmarket, abundant in parts of southern Hillsboro County.

Q. rubra L. var. **rubra.** Red Oak.

Generally common throughout at low elevations, occasionally extending up to 2,500 feet; less common in extreme northern parts of state; well drained soils.

var. **borealis** (Michx. f) Farw.

Limited field observations and the presence of herbarium specimens so labelled show that this variety is generally distributed; in the absence of fruits on majority of herbarium sheets it is impossible to separate much of the herbarium material satisfactorily, however: *Q. rubra* may cross with both *Q. coccinea* and *Q. velutina,* but no specimens from New Hampshire have been seen.

Q. coccinea Muench. Scarlet Oak.

Mostly confined to central part of southern New Hampshire in dry, sandy soil, where common; remote outlying station on Rattlesnake Mountain in Holderness may be of this species; *Q. coccinea* is often confused with the slightly more northerly *Q. velutina* which, in some of its forms, has deeply cut leaves similar to those of this species.

Q. velutina Lam. Black Oak.

Locally common in dry, often rich woods in southern New Hampshire extending north to Plainfield and Gilmanton: trees with several quite different leaf-shapes occur: forma *dilaniata* Trel. with deeply cut leaves, and f. *macrophylla* (Dippel) Trel. with leaves cut less than halfway to midrib being most common; typical *Q. velutina* with slightly lobed leaves (mostly a juvenile state), has been much less collected; forma *missouriensis* (Sarg.) Trel. with leaves permanently pubescent beneath should be sought for.

X. Q. Rehderi Trel.

Hybrid of *Q. velutina* and *Q. illicifolia* has been collected in Charlestown.

Q. ilicifolia Wang. Bear- or Scrub-Oak.

Common in southern and east central New Hampshire at low elevations, north in Connecticut Valley to Charlestown, in central New Hampshire to New Hampton, and in eastern New Hampshire to Conway; in dry, sandy soils or rocky areas.

Ulmus rubra Muhl. Slippery or Red Elm.

Common and obviously native in alluvial soils along shores of middle and lower Connecticut River north to Lebanon; scattered or rare elsewhere; probably much planted in former times and perhaps now persisting in many localities.

U. americana L. American or White Elm.

Common tree of river valleys, swampy woods, and open areas at low elevations throughout; several forms, varying in pubescence of leaves and young twigs, occur with the typical; these are f. *pendula* (Ait.) Fern., leaves smoothish and branchlets pubescent; f. *laevior* Fern., leaves smoothish, branchlets glabrous; f. *alba* (Ait.) Fern., leaves scabrous, branchlets pubescent; *f. intercedens* Fern., leaves scabrous, branchlets glabrous.

Celtis occidentalis L. var. **pumila** (Pursh) Gray. Hackberry.

Very restricted in New Hampshire, being known only in the lower Connecticut River Valley, in alluvial soils, from Lebanon to Walpole; common on banks of Connecticut River and islands at Plainfield where trees one foot in diameter or larger occur.

Morus alba L. White Mulberry.

Occasional escape in central and southern New Hampshire, probably not long persistent: introduced from Asia.

Clematis virginiana L. Virgin's bower.

Common throughout at low elevations; occurs chiefly in thickets, low woods and along streams: *f. missouriensis* (Rybd.) Fern., with leaves pubescent beneath is occasional.

C. verticillaris DC. Purple Clematis.

Infrequent; chiefly in central and northern New Hampshire, outlying stations in Durham and Windham; occurs mostly in rocky woods, on talus-slopes and ledges, often in calcareous areas: Rhodora 25:184, 1923 and 46:22-23, 1944.

Berberis vulgaris L. Common Barberry.

Frequent in central and southern New Hampshire, occasional in Coos County; commonest near habitations and in farmed areas; thoroughly naturalized in pastures, thickets, open woods and fence-rows: from Europe.

B. Thunbergii DC. Japanese Barberry.

Becoming a frequent escape in pastures, open woods and fence-rows throughout: introduced from Asia: Rhodora 15:225-226, 1913.

Sassafras albidum (Nutt.) Nees. var. **albidum**. White Sassafras.

Locally common in southeastern New Hampshire north to Wolfeboro, Hooksett, and Tamworth (where originally planted); confined to more southern townships in western New Hampshire; thickets and woods, particularly on warm slopes; occasionally as trees to 30-40 feet high, but usually occurring as shrubs.

Var. **molle** (Raf.) Fern. Red Sassafras.

About equally common and often not clearly separable from var. *albidum;* of similar range and habitat in New Hampshire.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Lindera Benzoin				x		x		x	x	
Ribes cynosbati	x	x	x	x	x	x	x		x	x
R. hirtellum var.										
hirtellum	x	x	x	x			x	x	x	
var. saxosum	x		x	x						
var. calcicola	x									
R. Grossularia	i								i	
R. lacustre	x	x	x							
R. glandulosum	x	x	x	x	x	x	x	x	x	x
R. triste	x	x	x							
R. sativum	i	i	i	i				i	i	i
R. americanum	x	x	x	x	x			x	x	x
R. nigrum	i	i	i	i						
R. odoratum										i
Hamamelis virginiana										
var. virginiana	x	x	x	x	x	x	x	x	x	x
var. parvifolia		x							x	
Platanus occidentalis				i			x		i	x
Physocarpus opulifolius				i		i	i			
Spiraea latifolia var.										
latifolia	x	x	x	x	x	x	s	x	x	x
var. septentrionalis	x	x	x							
S. tomentosa	x	x	x	x	x	x	s	x	x	x
Sorbaria sorbifolia	i	i	i	i		i		i		
Pyrus communis			i	i				i		
P. Malus	i	i	i	i	s	s	s	i	i	i
P. arbutifolia				i						
P. floribunda	x	x	x	x	x	x	x	x	x	x
P. melanocarpa	x	x	x	x	x	x	x	x	x	x
P. americana	x	x	x	x	x	x	x	x	x	x
P. decora var. decora	x	x	x			x	x			
var. groenlandica	x									

Lindera Benzoin (L.) Blume. Spicebush.

Local, mostly in southeastern New Hampshire, outlying stations in Peterboro, Francestown and Concord; swampy woods.

Species of *Ribes* serve as alternate hosts of the Pine Blister Rust. At present selective eradication is being carried on in areas of *Pinus Strobus*. After years of former intensive effort to reduce the *Ribes* population throughout the state, the following species are to be found in New Hampshire, some of them in considerable abundance locally.

Ribes cynosbati L. Prickly Gooseberry.

Frequent in northern, west central, and southwestern sections of state, at low elevations; outlying station in Strafford; rich and often rocky slopes and talus: forma *inerme* Rehder, lacking spines, occurs sparingly throughout range.

R. hirtellum Michx. var. **hirtellum.** Smooth Gooseberry.

Frequent at low elevations in swampy woods and openings in north, central and southeastern New Hampshire, no records from southwestern New Hampshire; the following vars. may be more abundant than is indicated by collections.

Var. **saxosum** (Hook.) Fern.

Occasional in range of species.

Var. **calcicola** Fern.

Specimen from Dalton.

R. **Grossularia** L. European Gooseberry.

Rare escape; collections from Milan and Manchester: introduced from Europe.

R. lacustre (Pers.) Poir. Bristly Black Currant.

Confined to northern and north central New Hampshire where frequent at low and medium elevations, reaching southern limits on southern slope of Sandwich Range in Sandwich; occurring chiefly in rocky and swampy woods.

R. glandulosum Grauer. Skunk-Currant.

Frequent throughout except near coast, extending into alpine areas of Presidential Range; talus slopes, swamps, and damp woods.

R. triste Pall. Wild Red Currant.

Infrequent; found mostly in the vicinity of the White Mountains and northward, outlying stations to south in Holderness and Wolfeboro; cool, damp woods mostly at low and medium elevations extending into subalpine areas of Presidential Range.

R. sativum Syme. Red or Garden-Currant.

Formerly a common escape in thickets and woods in southern New Hampshire, rare northward, occurring near habitations: naturalized from Europe.

R. **americanum** Mill. Wild Black Currant.

Mostly southern and central New Hampshire, outlying station in Whitefield; a local species of rich soil in thickets and woods.

R. nigrum L. Black Currant.

An infrequent escape near habitations: introduced from Europe.

R. odoratum Wendland f. Missouri Currant.

Rare escape, collections from Walpole and Marlboro: introduced from farther west in the United States.

Hamamelis virginiana L. var. **virginiana.** Witch-hazel.

Frequent throughout at low altitudes; woods, thickets and open areas.

Var. **parvifolia** Nutt.

Specimens from Manchester and Bartlett are sufficiently pubsecent to fit this taxon; several other specimens have slightly pubescent leaves.

Platanus occidentalis L. Sycamore, Buttonwood.

Occurs spontaneously in rocky stream-beds or along streams and pond-shores as far north as Lee and Surry as well as along the lower Connecticut River; such trees may be indigenous, or if not, they are at least thoroughly naturalized from farther west or south; often planted and obviously introduced elsewhere.

Physocarpus opulifolius (L.) Maxim. Ninebark.

An occasional escape from plantings in central and southern New Hampshire; none of stations are believed to be indigenous: introduced from elsewhere in the United States.

Spiraea latifolia (Ait.) Borkh. var. **latifolia.** Meadowsweet.

Widely distributed and common throughout at low elevations in moist situations and pastures; ascending to 4,000 feet, or above on rocky slopes and summits in the White Mountains.

Var. **septentrionalis** Fern.

Mostly in alpine areas of Presidential and Franconia Ranges; occasionally at lower elevations where tends to hybridize with var. *latifolia*: Rhodora 19:254-255. 1917.

S. tomentosa L. Hardhack, Steeple-bush.

Common and of wide distribution in New Hampshire at low elevations; pastures and open low ground: forma *albiflora* Macbr. with white flowers has been collected in Alstead and Wentworth: Rhodora 17:143, 1915.

Sorbaria sorbifolia (L.) A.Br. False Spiraea.

Frequently spreading to roadsides from cultivation and persisting around cellar-holes and along roadsides and fence-rows: introduced from Asia.

Pyrus communis L. Pear.

Occasional escape in southeastern New Hampshire, occurring along or near shores of Great Bay; one collection from Hanover: introduced from Eurasia.

P. Malus L. Apple.

Often too frequent as an escape into old fields and pastures, sometimes persisting in new woods; general throughout, near farms or in formerly settled areas: introduced from Eurasia.

P. arbutifolia (L.) L.f. Red Chokeberry.

Rare escape, spreading from planted specimens in Durham: introduced from farther south.

P. floribunda Lindl. Purple Chokeberry.

Common in central and southern New Hampshire becoming infrequent in Coos County, widely distributed at low and middle elevations; swamps, ledges, and dry thickets, with preference for wet situations: Rhodora 4:55-57, 1902.

P. melanocarpa (Michx.) Willd. Black Chokeberry.

Common and generally distributed at low and middle elevations up to 3,500 feet; same habitats as above, but more often in dry places, chiefly in open situations: hybrids with *P. floribunda* often occur when the parents are in proximity.

P. americana (Marsh.) DC. American Mountain-Ash.

Common in northern New Hampshire; ascending to tree-line; abundant in areas of recent windfall and lumbering, also on rocky ridges and in lowlands along borders of streams and in cool woods; frequent at middle altitudes in central and southern New Hampshire, occasional in lowlands: hybrids with both *P. floribunda* and *P. melanocarpa* may be expected but none have been collected in New Hampshire; probably also hybridizes with *P. decora* since many specimens are intermediate in character.

P. decora (Sarg.) Hyland var. **decora.** Mountain-Ash.

Common in northern New Hampshire in same habitats as foregoing; outlying stations in Concord, Springfield and Grantham.

Var. **groenlandica** (Schneid.) Fern.

Dwarfed specimen from Mt. Monroe seems to belong here.

Amelanchier (Shadbush, Juneberry, Serviceberry) is a difficult genus with much hybridization, exhibiting great variation especially in disturbed habitats. The specimens of *A. Wiegandii* from New Hampshire have much finer leaf teeth than is indicated in the key and description in Gray's Manual ed. 8.

Amelanchier sanguinea (Pursh.) D.C.

Occasional on river-ledges and banks; apparently with calcareous affinities; along the Connecticut River and Great Bay shores in Strafford County; outlying station in Sutton: may hybridize locally with other species in vicinity.

A. Wiegandii Nielsen.

Occasional; all of collections are from Coos and northern Grafton counties with an outlying station at Plainfield: further study of this taxon needed in New Hampshire.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Amelanchier sanguinea	x	x	x	x		x	x			x
A. Wiegandii	x		x				x			
A. stolonifera	x	x	x	x	x	x	x	x	x	x
A. candadensis		x	x	x	x	x	x	x	x	x
A. arborea		x	x	x	x		x		x	x
A. laevis	x	x	x	x	x	x	x	x	x	x
A. Bartramiana	x	x	x	x			x			x
Crataegus monogyna				i						
C. punctata			x							x
C. chrysocarpa var. chrysocarpa	x	x	x	x	x	x		x		x
var. phoenicea	x		x							x
C. Faxoni			x	x						x
C. Brunetiana				x						
C. Brainerdi var. Brainerdi	x	x	x	x			x		x	x
var. asperifolia			x							x
var. scabrida										x
var. Egglestoni										x
C. Websteri			x							
C. macrosperma var. macrosperma	x	x	x	x	x			x	x	x
var. acutiloba	x	x	x	x		x	x			x
var. matura		x	x	x	x					x
var. pentandra			x							
var. roanensis	x		x							x
C. basilica										x
C. lemingtonensis	x		x							
C. flabellata var. Grayana	x		x							x
C. insolens	x									
C. Beckwithae										x
C. pruinosa var. pruinosa			x							x
var. dissona										x

A. stolonifera Wieg.

General and common at low elevations in central and southern New Hampshire, becoming infrequent north to Cambridge; ascending to 2,500 feet on rocky slopes and summits, but mostly in sandy areas at low elevations: hybridizes with *A. sanguinea, A. arborea, A. laevis* and *A. Bartramiana*: forma *micropetala* (Robins.) Rehder, with reduced petals is occasional.

A. canadensis (L.) Medic.

Abundant in southern New Hampshire, occasional in central New Hampshire north to Sandwich; one outlying station at Echo Lake, Franconia; in moist or swampy situations: hybridizes with *A. stolonifera, A. arborea* and *A. laevis.*

A. intermedia Spach.

To be expected, but possibly not yet collected in New Hampshire; specimen from Bradford suggests this taxon but lacks flowers and fruits.

A. arborea (Michx.f.) Fern.

Infrequent in southern and central New Hampshire, north to Sandwich and Lebanon; locally common in Great Bay area on shores; hybridizes with *A. canadensis*, *A. laevis* and *A. Bartramiana*.

A. laevis Wieg.

General and common throughout at low elevations ascending occasionally to 3,000 feet; in swamps, clearings, along streams, and in forest openings: often tree-like: hybridizes with all other common species of *Amelanchier*.

A. Bartramiana (Tausch.) Roemer. Mountain-Juneberry.

Common on slopes of White Mountains in coniferous forest, ascending to subalpine areas of Presidential Range; also common in cold bogs and thickets at low elevations in northern and north central New Hampshire; outlying stations occur in Washington in Sullivan County, on Mt. Monadnock in Cheshire County and near Great Bay in Durham: hybridizes with other species but usually flowers earlier: Rhodora 26:178-179, 1924.

The following treatment of *Crataegus* (Hawthorn) in New Hampshire is offered with reservation. There is first of all considerable hybridization in the group which makes identification often uncertain; apomixis and polyploidy are believed to be common; then many of the so-called "species" are highly localized being known only from one or two stations. There is thus an excessive accumulation of taxons in the genus of quite different biological value, some reasonably stable with broad ranges resembling "species" in the usual sense and many others of recent origin and perhaps of only temporary status. The more wide ranging taxons have been subdivided by students whenever possible into a multiplicity of so-called "varieties" many of which seem to be too inconstant and variable to be useful. Because of the many problems in *Crataegus* which require profound study, the authors in most cases have accepted without critical examination the identifications of specimens in the herbaria, the majority of which were made by students of *Crataegus* or by critical collectors. The generic habitat preferences are thickets, river banks, fence-rows, pastures and dry hillsides, always at low elevations. Individual specific habitats are, in the present state of our knowledge, difficult to determine.

Crataegus monogyna Jacq.

Escaped in Durham, probably not naturalizing: introduced from Eurasia.

C. punctata Jacq.

Confined to lower Connecticut Valley from Hanover to Walpole.

C. chrysocarpa Ashe var. **chrysocarpa.**

Apparently generally common throughout state, at low elevations.

Var. **phoenicea** Palmer.

Less common but scattered throughout range.

C. Faxoni Sarg.

Franconia (Ham Branch Bridge) is type locality, also in Walpole and Durham: Rhodora 5:161-162, 1903.

C. Brunetiana Sarg.

Durham, only collection.

C. Brainerdi Sarg. var. **Brainerdi.**

Common and probably generally distributed.

Var. **asperifolia** (Sarg.) Eggleston.

Collected in Holderness and Walpole.

Var. **scabrida** (Sarg.) Eggleston.

Troy, only collection.

Var. **Egglestoni** (Sarg.) Robins.
Walpole, only collection.

C. **Websteri** Sarg.
Probably of hybrid origin, collected in Holderness: Rhodora 7:215-216, 1905.

C. macrosperma Ashe var. **macrosperma.**

Common and of general distribution in New Hampshire.
Var. **acutiloba** (Sarg.) Eggleston.
Also widely distributed; in range of typical.

Var. **matura** (Sarg.) Eggleston.
Perhaps more southern than var. *macrosperma;* none of the numerous stations occurs north of Franconia.

Var. **pentandra** (Sarg.) Eggleston.
A single collection (Holderness).

Var. **roanensis** (Ashe.) Palmer.
Occasional; northern and western in New Hampshire.

C. **basilica** Beadle.
Walpole, only collection.

C. lemingtonensis Sarg.
Collected in Shelburne and Holderness.

C. flabellata (Spach) Kirchn. var. **Grayana** (Eggleston) Palmer.
Collection from Shelburne, Bethlehem, and Walpole.

C. insolens Sarg.
Specimens, so labelled in New England Botanical Club collection are from Gorham and Randolph, but in Gray's Manual ed. 8 it is indicated that it is known only from West Concord, Vermont.

C. Beckwithae Sarg.
Walpole, only collection.

C. pruinosa (Wendl.) Koch. var. **pruinosa.**
Said to have been abundant on the Drewsville Plain, Walpole, Cheshire County by Fernald in 1899; another collection, so named, from Hanover not easy to distinguish from the next.

Var. **dissona** (Sarg.) Eggleston.
Collected in Walpole.

C. Holmesiana Ashe. var. **Holmesiana.**
Collections from Walpole and Haverhill.

Var. **villipes** Ashe.
One station in West Lebanon.

C. pedicellata Sarg.
Apparently scarce; mostly in western New Hampshire, from Hanover and Benton southward, outlying station in Rochester (perhaps is this species).

C. submollis Sarg.
Hanover and Lebanon specimens in Jesup Herbarium which are very pubescent and are labelled *C. tomentosa* may be of this species.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
C. Holmesiana var. Holmesiana			x							x
var. villipes			x							
C. pedicellata			x	x			x			x
C. submollis			x							
C. succulenta var. succulenta		x	x	x						
var. macracantha	x		x	x						
Potentilla fruticosa	x	x	x			x	x	x	x	x
Rosa gallica	i								i	
R. Eglanteria	i	i	i	i	i	i	i	i	i	i
R. nitida	x	x	x	x		x		x	x	
R. virginiana	x	x	x	x	x	x	x	x	x	x
R. palustris	x	x	x	x	x	x	x	x	x	x
R carolina var. carolina		x	x	x		x	x	x	x	x
var. villosa	x		x		x				x	
var. grandiflora			x					x	x	
R. spinosissima	i			i						
R. rugosa	i			i		i		i		
R. cinnamomea	i	i	i	i	i		i	i	i	
R. acicularis var. Bourgeauiana	x						x			
R. blanda	x		x		x		x			x
Prunus insititia	i									
P. spinosa				i						
P. maritima				x		x		x		
P. americana				i						i
P. nigra	i	i	i	x	i			s	x	x
P. susquehanae		x	x	x				x	x	x
P. depressa	x		x				x			x
P. pensylvanica	x	x	x	x	x	x	x	x	x	x
P. avium				i						

C. succulenta Link. var. **succulenta.**

In central Connecticut Valley at Bath, Haverhill, and Hanover; in Strafford County at several stations, and one station in Wolfeboro in Carroll County.

Var. **macracantha** (Lodd.) Eggleston.

Occasional throughout.

Potentilla fruticosa L. Shrubby Cinquefoil.

Of local occurrence in northern New Hampshire and mostly west of Merrimack River in southern New Hampshire, with outlying stations in Londonderry, Windham and Manchester; subalpine areas in Presidential Range, talus slopes, and cliffs in mountains; pastures and bushy meadows at lower elevations.

Our native species of *Rosa* while often clearly defined, tend to hybridize, resulting in genetically complex populations often impossible to assign to any particular species; such hybrids are often classed with one or other of the parent species and, like many genera in which hybridization is common, the herbarium collections thus tend to show an unwarranted range of intraspecific variation

Rosa gallica L. French Rose.

Occasional in northern, and southwestern parts of New Hampshire; long persisting around old cellars and escaping to roadsides: introduced from Europe.

R. Eglanteria L. Sweet-Brier.

Of frequent occurrence throughout, near houses or old cellar-holes, as well as in pastures, thickets, and open woods; often common and tending to spread widely: naturalized from Europe.

R. nitida Willd.

Infrequent, but probably throughout at low elevations; swampy woods, bogs, and pond-margins.

R. virginiana Mill.

At low elevations in swamps and thickets; the common wild rose of southeastern and east central New Hampshire, scarce in Coos County north to Stewartstown, decreasing west to Connecticut River: forma *nanella* (Rydb.) Fern. is a dwarf variant represented in New Hampshire by a specimen from Barrington.

R. palustris Marsh.

At low elevations: rare in northern New Hampshire, in central and southern New Hampshire generally distributed and locally abundant in swamps and around ponds.

R. carolina L. var. **carolina.**

Frequent at low elevations in central and southern New Hampshire, north to Lisbon and Wakefield; dry or rocky situations.

Var. **villosa** (Best) Rehd.

Frequent throughout range, outlying station in Shelburne.

Var. **grandiflora** (Baker) Rehd.

Several specimens seem to fit this variable taxon.

R. spinosissima L. Scotch Rose.

Near old cellar-holes and abandoned houses, an occasional escape: introduced from Europe.

R. rugosa Thunb.

Well established and becoming naturalized near coast: collected inland as an escape in Shelburne and Wilmot where tending to persist and spread clonally: naturalized from East Asia.

R. cinnamomea L. Cinnamon-Rose.

Infrequent; generally distributed, becoming more common northward: persisting and clonally spreading around abandoned houses and roadsides: introduced from Eurasia.

R. acicularis Lindl. var. **Bourgeauiana** Crepin.

Local species in New Hampshire; stations at Plainfield and Randolph: apparently hybridizes with *R. blanda*: rocky and sandy shores above high-water line, and dry places.

R. blanda Ait.

Common in lower Connecticut Valley, decreasing in abundance north to Columbia, with one outlying station in Belmont; sandy and rocky shores and open banks, chiefly of a calcareous nature.

Prunus insititia L. Damson.

Rare escape, Shelburne: introduced from Europe.

P. spinosa L. Sloe.

Escaped to fence-rows in Durham in two separate places: introduced from Europe.

P. maritima Marsh. Beach-Plum.

Common along the coast at upper limits of beaches and in dunes; locally inland in sandy soil in southeastern New Hampshire.

P. americana Marsh. Wild Plum.

Thickets and fence-rows; Surry and Alstead in Cheshire County where perhaps indigenous and Durham where undoubtedly introduced, though now spreading.

P. nigra Ait. Canada Plum.

Frequent and widespread at low elevations, chiefly in roadside thickets and edges of woods; always appearing introduced in northern New Hampshire, perhaps partly native southward.

P. susquehanae Willd. Sand-Cherry.

Common in and near Merrimack Valley extending north to Ashland, one station in lower Connecticut Valley at Hinsdale, and occasional in northern Strafford and Carroll counties; sandy shores and dry warm rocky slopes: Rhodora 25:69-74, 1923.

P. depressa Pursh. Sand-Cherry.

Local in Androscoggin River Valley at Shelburne, frequent in Pemigewasset River Valley from Thornton to Ashland in Grafton County and in Connecticut Valley from Bath to Walpole; river ledges and gravels usually below high-water line: Rhodora 25:69-74, 1923.

P. pensylvanica L.f. Bird-or Pin-Cherry.

General and common throughout state at low and medium elevations; most abundant in burned and cut-over woodland, also in rocky sparse woods and on ledges.

P. avium L. Sweet Cherry.

Rare escape; one collection from Durham near Great Bay: introduced from Eurasia.

P. Cerasus L. Sour Cherry.

Occasional escape in Durham, Lee and Hanover, probably not much spreading: introduced from Asia.

P. serotina Ehrh. Black or Rum-Cherry.

General and common at low elevations; well drained woods, roadsides and edges of fields.

P virginiana L. Choke-Cherry.

Wide ranging and abundant at low elevations, occasionally ascending to 3,500 feet; roadside thickets, edges of woods, open rocky slopes, ledges, and river banks.

Gleditsia triacanthos L. Honey-Locust.

Occasional escape along fence-rows, chiefly in southern New Hampshire: naturalized in New England from farther west and south.

Amorpha fruticosa L. False Indigo.

Infrequent escape; Dummer in Coos County and Durham in Strafford County: introduced from farther west and south.

Robinia Pseudo-Acacia L. Black Locust.

Frequent escape from cultivation, of rather general distribution; near houses, along roadsides, and fence-rows; more common in central and southern New Hampshire, absent from northern Coos County: naturalized from farther south in United States.

R. viscosa Vent. Clammy Locust.

Escape from cultivation, locally common near houses and along roadsides in central and southern New Hampshire: naturalized from farther south in United States.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
P. Cerasus			i	i						
P. serotina	x	x	x	x	x	x	x	x	x	x
P. virginiana	x	x	x	x	x	x	x	x	x	x
Gleditsia triacanthos			i	i					i	i
Amorpha fruticosa	i			i						
Robinia Pseudo-Acacia	i	i	i	i	s	s		i	i	i
R. viscosa			i	i	i	i	s	i	i	i
R. hispida		i		i						
Xanthoxylum americanum									x	x
Ptelea trifoliata				i	i				i	
Empetrum nigrum	x	x	x							
E. atropurpureum	x	x	x							
Rhus typhina	x	x	x	x	s	x	x	x	x	x
R. glabra var. glabra	x	x	x	x	x	x	x	x	x	x
var. borealis	x									
R. copallina var. latifolia		x	x	x		x	x	x	x	x
R. Vernix		x		x	x	x	s	x	x	x
R. radicans var. radicans	x		x	x		x		x	x	
var. vulgaris		x	x	x	x				x	
var Rydbergii	x	x	x	s	s	x	x	x	x	s
Ilex verticillata var. verticillata	x	x	x	x	x	x	x	x	x	x
var. padifolia		x		x	x			x	x	
var. tenuifolia	x	x	x	x	x		x	x	x	x
I. laevigata				x		x		x	x	x
I. glabra								x		
Nemopanthus mucronata	x	x	x	x	x	x	x	x	x	x
Euonymus europaeus				i				i		
Celastrus scandens	x	x	x	x	x	x	x	x	x	x
Staphylea trifolia			x				x			x

R. hispida L. Bristly Locust.

Local escape from cultivation; stations in Barrington and Tamworth: introduced from farther south in United States.

Xanthoxylum americanum Mill. Northern Prickly Ash.

Rare and local; confined to southern New Hampshire; stations in Alstead, Winchester, and Nashua; rich woods; reported from Surry: Rhodora *3*:234, 1901.

Ptelea trifoliata L. Hop-tree.

Occasional escape from cultivation into thickets and waste places; stations in Rollinsford, Laconia, and Milford: introduced from south and west of New England.

Empetrum nigrum L. Black Crowberry.

Common in alpine and subalpine areas of Presidential and Franconia ranges, descending to summits of some of lower peaks in northern and north central New Hampshire; gravelly and peaty soils sometimes in boggy habitats: the purplish fruited f. *purpureum* (Raf.) Fern., and whitish f. *leucocarpum* L. M. Neuman are perhaps to be expected but have not yet been reported.

E. atropurpureum Fern. & Wieg. Purple Crowberry.

Open rocky places, gravelly patches and wet areas on upper slopes and near summits of White Mountains; most common on lower mountains, but ascending to alpine zone on Mt. Washington: Rhodora 15:214-215, 1913.

Rhus typhina L. Staghorn-Sumac.

Widely distributed and common at low elevations, becoming infrequent in Coos County; old fields, pastures, fence-rows, dry shallow soils, in rocky areas or in gravels: forma *laciniata* (Wood) Rehd. described originally from New Hampshire, with leaflets deeply and narrowly toothed is found occasionally throughout range in New Hampshire, often appearing to be diseased: Wood, Am. Bot. Flor. pt. 4:73, 1870 and Rhodora 9:115, 1907.

R. glabra L. Smooth Sumac.

Widely distributed and often common at low elevations in southern New Hampshire, becoming infrequent to rare northward to Colebrook; similar habitats as foregoing: forma *laciniata* (Carr.) Robins, with leaves nearly or quite bipinnate was once collected at Alcott Falls in Lebanon.

var. **borealis** Britt.

Probably a hybrid of *R. typhina* and *R. glabra;* one collection from Jefferson.

R. copallina L. var. **latifolia** Engler. Dwarf or Shining Sumac.

Reaches northeastern limit of range in southern Maine and central New Hampshire; at low altitudes; locally common in southern New Hampshire, extending north to Madison and Plymouth; rocky and gravelly slopes, open woods, and clearings.

The following species, differing from the foregoing Sumacs by having white rather than red fruits and entire leaflets without winged petioles are extremely poisonous in contact with most persons; the common names, Poison Sumac and Poison Dogwood for *R. Vernix* should not lead one to confuse it with the true Dogwoods of the genus *Cornus* which are quite harmless.

R. Vernix L. Poison Sumac, Poison Dogwood, Poison Elder.

With compound leaves and entire leaflets; a relatively southern species of swampy woods, bogs, and shores of ponds, frequent in southern counties at low elevations, extending north to Lempster and Bradford in south central New Hampshire, and to Sandwich and Tamworth in eastern part of state.

R. radicans L. Poison Ivy, Poison Oak.

With leaflets in 3's and shiny, commonly known as Poison Ivy, is a far too abundant plant over much of the state; of considerable genetic diversity it appears in several sometimes distinct varieties and forms; careful field-study and complete collections are needed.

Var. **radicans**

Common at low elevations and in much of southern New Hampshire, becoming infrequent northward to Gorham; roadsides, fence-rows, and open woods: forma *malachotrichocarpa* (A. H. Moore) Fern., with pubescent fruits, is local near coast.

Var. **vulgaris** (Michx.) DC.

Probably common in southern and central New Hampshire although not much collected; north to Ossipee; same habitat as above.

Var. **Rydbergii** (Small) Rehd.

Locally common in northern New Hampshire and probably throughout at low elevations; distinct on talus-slopes, less well marked along roads, railroads, and in alluvial soils.

Ilex verticillata (L.) Gray. var. **verticillata.** Black Alder, Winterberry.

Common throughout in swamps, bogs, shores of ponds, and thickets, at low altitudes: forma *chrysocarpa* Robins., with yellow fruits, has been collected in Berlin.

Var. **padifolia** (Willd.) T. & G.

Similar situations but less common and more southern, extending northward to Sandwich.

Var. **tenuifolia** (Torr.) S. Wats.

Perhaps sometimes confused with *I. laevigata* in southern New Hampshire; general in same habitats as other varieties, but less common than typical.

I. laevigata (Pursh.) Gray. Smooth Winterberry.

Infrequent, reaching northeastern limits of range in southern Maine and southern New Hampshire; northern stations at Bradford, Wilmot, Deerfield and Strafford; swampy woods.

I. glabra (L.) Gray. Inkberry.

Very rare, one known station in New Hampshire close to Massachusetts line in Seabrook; a small colony in swampy woods near coast: Rhodora 57:34-36, 1955.

Nemopanthus mucronata (L.) Trel. Mountain-Holly.

General and common throughout at low and medium elevations; swampy woods, and bogs, edges of ponds, moist coniferous woods on mountain slopes and sometimes near summits.

Euonymus europaeus L. European Spindle-tree.

Escaped from cultivation in Milton, Hampton, and perhaps elsewhere: introduced from Europe.

Celastrus scandens L. Climbing Bittersweet.

Frequent in southern New Hampshire at low altitudes, becoming infrequent northward to Stark; rocky slopes, talus slopes, thickets, river banks, and woods.

Staphylea trifolia L. Bladdernut.

Rare in central and lower Connecticut Valley; north to Plainfield, West Lebanon, and Hanover (the latter doubtfully native); thickets, and rich woods.

Acer Ginnala Maxim.

Rare escape, spreading in Durham to old fields and adjacent woods: introduced from Asia.

A. spicatum Lam. Mountain-Maple.

Common in cool woods, rocky slopes, and talus at low and medium elevations in northern New Hampshire, becoming infrequent southward.

A. pensylvanicum L. Striped Maple.

Common at low elevations in northern New Hampshire in rich, cool woods, decreasing in abundance in southern New Hampshire.

A. platanoides L. Norway Maple.

In Durham and Seabrook, tending to spread by seeds at some distance from cultivated trees: introduced from Europe.

A. saccharum Marsh. Rock- or Sugar-Maple.

General and common throughout at low and medium elevations to about 2,500 feet; a climax tree of rich woods: forma *conicum* Fern. is an extreme with strongly ascending branches forming a conical tree known only from the type-locality at Woodstock, New Hampshire. *A. saccharum* is a variable species exhibiting considerably more variation in leaf-pubescence than is stated in Gray's Manual ed. 8; for example, in Newmarket and Durham and probably elsewhere there are found specimens with pronounced pubescence on the lower surfaces of mature leaves, but which in no other respect resemble the following species.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Acer Ginnala				i						
A. spicatum	x	x	x	x	x	x	x	x	x	x
A. pensylvanicum	x	x	x	x	x	x	x	x	x	x
A. platanoides			i	i				i		
A. saccharum	x	x	x	x	s	x	x	x	x	x
A. nigrum										x
A. rubrum var. rubrum	x	x	x	x	x	x	x	x	x	x
var. trilobum		x	x						x	
A saccharinum	x	x	x	x		x	x	x	x	x
A. Negundo	x		x	i			x		i	x
Aesculus glabra				i						
Rhamnus alnifolia	x	x	x	x	x			x		
R. cathartica		i	i	i			i	i	i	i
R. Frangula	i		i	i			i	i	i	i
Ceanothus americanus			x	x		x	x	x	x	x
Parthenocissus										
quinquefolia			x	x		x	x		x	x
P. inserta	x	x	x	x	s	x	x	x	x	x
Vitis labrusca		x	x	x	x	x	s	x	x	x
V. aestivalis var.										
aestivalis									x	
var. argentifolia				x		x	x	x	x	x
V riparia var. riparia	x	x	x	x		x	x		x	x
var. syrticola			x				x			
V. novae angliae	x		x							x
Tilia americana	x	x	x	x	s	x	x	x	x	x
Hudsonia ericoides		x				x				
H. tomentosa		x						x		
var. intermedia		x								
Dirca palustris	x	x	x	x	x			x		x
Daphne Mezereum				i				s		

A. nigrum Michx. f. Black Maple.

Closely related to *A. saccharum* and perhaps better considered as a variety of it; the only specimens from New Hampshire are two collections from river-bottoms and alluvial woods respectively in Alstead, Cheshire County.

A. rubrum L. var. **rubrum.** Red, Swamp- or Soft Maple.

General and common throughout at low elevations, occasional at medium elevations to 4,000 feet; abundant in wet woods and swamps but present in a wide variety of situations, sometimes very dry. The color of flowers shows pronounced variation attributable in part to the sexuality of the tree; trees chiefly or entirely pistillate are darker red while staminate trees are light in color: forma *pallidiflorum* (K. Koch) Fern., with yellowish flowers occurs locally: forma *tomentosum* (Desf.) Dansereau is occasional.

Var. **trilobum** K. Koch.

In same habitat as typical, but less common, often occurring in very wet situations.

A. saccharinum L. Silver, White, Soft or River-Maple.

Frequent along rivers in alluvial soils throughout most of state, north to Stratford along Connecticut River and to Wentworth Location on Magalloway River; often cultivated.

A. Negundo L. Box-Elder, Ash-leaved Maple.

Abundant in much of Connecticut Valley where undoubtedly native north to Columbia; elsewhere frequent escape from cultivation to dumps, waste-areas, etc.

Aesculus glabra Willd. Ohio Buckeye.

Spontaneous in woods at Rochester in Strafford County, planted parent-tree occurring nearby: introduced from farther west and south in United States.

Rhammus alnifolia L'Her. Alder-leaved Buckthorn.

Swamps and wet bushy meadows at low elevations; local in small scattered colonies in north and central New Hampshire, outlying stations to southeast in Lee and Kensington; the range — statement applied to it in Gray's Manual ed. 8, "— n. and w. New England" hardly applies to the Lee and Kensington stations.

R. cathartica L. Common Buckthorn.

Frequent escape from cultivation in southern New Hampshire north to Hanover and Ossipee; occurs chiefly in thickets and fence-rows; naturalized from Europe.

R. Frangula L. Alder-Buckthorn.

Becoming thoroughly naturalized locally in thickets, pastures and moist woods in settled areas: at current rate of spread may be expected to become abundant in a few years: naturalized from Europe: Rhodora 52:163, 1950.

Ceanothus americanus L. New Jersey Tea.

Locally abundant, becoming scarce northward; southern species reaching northeastern limits in central Maine extending north in New Hampshire to Haverhill in Connecticut Valley, Concord in Merrimack Valley and Durham in Strafford County; dry woods, slopes and roadside-banks.

Parthenocissus quinquefolia L. Virginia Creeper, Woodbine.

Supposed to be native north to southwest Maine and southern New Hampshire; most of the New Hampshire material may have escaped from cultivation, roadsides having been the most frequent habitat for collections; common as an escape or native in Rockingham and Hillsboro counties, outlying stations in Hooksett and Lebanon: forma *hirsuta* (Donn.) Fern., with leaflets pubescent beneath not known from New Hampshire.

P. inserta (Kerner) K. Koch.

Generally common throughout at low elevations; woods, thickets, borders of streams, and wooded rocky slopes: forma *dubia* Rehd. with leaves pubescent beneath, occasional: forma *macrophylla* (Lauche.) Rehd. with large leaves is frequent in rich soil and around dumps, etc., and seems to be an environmental state.

Vitis labrusca L. Fox-Grape.

Frequent in southern and central New Hampshire; roadsides, low woods, and river-banks north to Tamworth, Wilmot, and Hanover; perhaps many of numerous occurrences are escapes from cultivation; improved cultivars have been grown extensively throughout the present range.

V. aestivalus Michx. var. **aestivalis.** Summer-Grape.

Single specimen from Hillsboro; northeastward extension of range.

Var. **argentifolia** (Munson) Fern. Summer-Grape.

Reaching northeastern limit in southern New Hampshire, northernmost stations in Rochester, Barrington, Hooksett, and Charlestown, becoming more common southward, particularly in Rockingham County; dry, often rocky woods.

V. riparia Michx. var. **riparia.** River-bank or Frost-Grape.

Common along lower Connecticut River north to Lebanon; infrequent north to Plymouth, Bartlett and Shelburne, somewhat isolated in Strafford County; river-banks and rich thickets at low elevations.

Var. **syrticola** (Fern. & Wieg.) Fern.

Specimens from Plainfield and Lebanon in central Connecticut Valley match characteristic material of this variety in herbaria; a considerable extension of range eastward.

V. novae-angliae Fern. New England Grape.

Extending farthest north in New Hampshire of any of our grapes, reaching Stark in Coos County; local and scattered at low elevations; rich thickets, mostly near rivers: Rhodora 19:144-147, 1917.

Tilia americana L. Basswood, Linden.

Frequent and generally distributed throughout at low elevations in moist rich woods and alluvial areas.

Hudsonia ericoides L. Golden-heather, Hudsonia.

Species of markedly disrupted distribution; entirely in dry sands in New Hampshire; in vicinity of Ossipee Lake in Ossipee, and Freedom, and on high banks of the Merrimack River at Concord, (Rhod. 2:22, 1900) the latter station rather extensive and unmixed with other Hudsonias: forma *leucantha* Fern., with white flowers has not been collected in New Hampshire.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Nyssa sylvatica		x	x	x	x	x		x	x	x
Cornus florida				x				x	x	x
C. stolonifera	x	x	x	x	s	x	x	x	x	x
C. rugosa	x	x	x	x	x	x	x	x	x	x
C. Amomum		x	x	x	x	x	x	x	x	x
C. obliqua			x	x		x	x	x	x	x
C. racemosa		x	x	x		x		x	x	x
C. alternifolia	x	x	x	x	s	x	x	x	x	x
Clethra alnifolia				x		x		x	x	
Ledum groenlandicum	x	x	x	x		x	x		x	x
Rhododendron maximum		x		i	x	x	x		x	x
R. lapponicum	x									
R. canadense	x	x	x	x	x	x		x	x	x
R. roseum		x	x			x	x	x	x	x
R. viscosum								x	x	
Loiseleuria procumbens	x									
Kalmia latifolia		x	x	x	x	x		x	x	x
K. angustifolia	x	x	x	x	x	x	x	x	x	x
K. polifolia	x	x	x	x	x	x	x	x	x	x
Phyllodoce caerulea	x		x							
Andromeda glaucophylla	x	x	x		s	x		x	x	
Lyonia ligustrina		x	x	x	x	x	x	x	x	x
Chamaedaphne calyculata var. angustifolia	x	x	x	x	x	x	x	x	x	x
var. latifolia	x		x	x						
Cassiope hypnoides	x									
Epigaea repens var. glabrifolia	x	x	x	x	x	x	x	x	x	x
Gaultheria procumbens	x	x	x	x	x	x	s	x	x	x
G. hispidula	x	x	x	x	x	x		x	x	x
Arctostophylos Uva-ursi var. coactilis	x	x	x	x			x	x	x	

H. tomentosa Nutt. var. **tomentosa.** Beech-heath, Hudsonia.

Chiefly near the coast where common among dunes and near beaches in sands; also along upper sandy shores of Ossipee Lake in Ossipee and Freedom where it occurs with *H. cricoides* and *H. tomentosa* var. *intermedia.*

Var. **intermedia** Peck.

This taxon in New Hampshire is often found in the general vicinity of *H. cricoides* and *H. tomentosa* and therefore since it is more or less intermediate in character between the two, may then be a hybrid; more study is needed to show whether there is genetic homogeneity in the specimens from all parts of the range; common in sandy valley of the Saco River at Conway and Bartlett and on shores of Ossipee Lake.

Dirca palustris L. Leatherwood.

Occurring occasionally and never abundantly; probably throughout; rich thickets, moist ravines, and springy places.

Daphne Mezereum L. Daphne.

Well established in pasture-ravines in Durham: naturalized from Europe.

Nyssa sylvatica Marsh. Black Gum,, Pepperidge, Sour Gum, Tupelo.

Swampy woods, shores of ponds and lakes at low elevations; occasional in southern and east central New Hampshire, north to Conway and Holderness.

Cornus florida L. Flowering Dogwood.

Except for station in York and unverified report from Winthrop, Maine, reaches northeast limit of range in Strafford County, New Hampshire, where several extensive stands occur on warm, dry south-facing slopes in deciduous forest; farther south in New Hampshire perhaps less strictly confined to southern exposures; plants exhibit much genetic variation in our isolated colonies; biggest specimens commonly attain heights of 25 feet or more: no named forms have been collected in New Hampshire.

C. stolonifera Michx. Red Osier.

Occurring throughout at low elevations, common in northern New Hampshire becoming less frequent southward: often cultivated and perhaps sometimes escaped from cultivation in southern New Hampshire; swampy woods, thickets and edges of ponds and streams: f. *repens* Vict., depressed and rooting at nodes is occasional.

C. rugosa Lam. Round-leaved Dogwood.

Generally distributed at low elevations; locally common southward, becoming infrequent northward; rocky or dry wooded slopes and talus north to Stark: specimens approaching forma *cucycla* Fern., with leaves orbicular have been seen in New Hampshire.

C. Amomum Mill. Red Willow.

Difficult to distinguish at all times from *C. obliqua* which it resembles in many ways and with which it apparently crosses; *C. Amomum* is common at low elevations in southern and central New Hampshire, north to Madison and Lebanon; swamps, shores of ponds, and streams and thickets.

C. obliqua Raf. Silky Dogwood.

Common in lower Connecticut Valley, less common elsewhere in southern and south central New Hampshire, north to Lebanon, Grantham, and Alton; in same habitats as last.

C. racemosa Lam. Gray Dogwood.

Locally common in southeastern and east central New Hampshire, north to Wolfeboro; outlying station in Bath; open swamps, roadsides, and thickets, often in heavy soils.

C. alternifolia L. f. Pagoda- or Alternate-leaved Dogwood.

General and common in well-drained woodlands throughout; at low elevations ascending to 2000 feet.

Clethra alnifolia L. Sweet Pepperbush.

Reaches northwest limits in southern Maine; in New Hampshire locally common; at low elevations, mostly confined to southeastern New Hampshire, north to Somersworth and Hooksett, west to Rindge in Cheshire County; swampy and sandy woods and along the shores of ponds and streams.

Ledum groenlandicum Oed. Labrador-tea.

Bogs and peats in alpine areas and cold bogs at medium and low elevations; common in northern and north central New Hampshire becoming infrequent southward; forma *denudatum* Vict. & Rousseau, has not been collected in New Hampshire.

Rhododendron maximum L. Great Laurel, Rosebay.

In wet woods, swamps and borders of swamps; of markedly disjunct distribution in New Hampshire; now known as native from the following list of townships though reliably reported from several others in the past: Grantham, Albany (the northernmost station), Pittsfield, Barnstead, Wilton, Mason, Manchester, Fitzwilliam, and Richmond; tends to persist and spread following planting; such plants should not be construed as native; forma *album* (Pursh) Fern., is occasional with the typical; none of the other named forms have been found in New Hampshire: Rhodora 18:25-26, 1916, 18:73-74, 1916, 40:461-462, 1938 and 52:215-218, 1950.

R. lapponicum (L.) Wahlenb. Lapland Rosebay.

Confined to alpine areas of Presidential Range, where common in dry soils.

R. canadense (L.) Torr. Rhodora.

Generally distributed and common although infrequent in lower Connecticut Valley; bogs, wet pastures, and occasionally on rocky slopes of mountains, ascending to alpine area of Mt. Washington.

R. roseum (Loisel.) Rehd. Early Azalea, Election-pink.

Reaches northeastern limit in southwest Maine, frequent in southwestern New Hampshire, becoming occasional in central New Hampshire east to Sandown and Nottingham and north to Madison and Bath; at low elevations, ascending to 1700 feet in Washington, Sullivan County; dry woods and rocky slopes.

R. viscosum (L.) Torr. Swamp-Honeysuckle, Clammy Azalea.

Reaches northeastern limits in southwestern Maine, known in New Hampshire only from Pelham and Windham; swamps and moist thickets: forma *glaucum* (Lam.) Voss. occurs with the typical.

Loiseleuria procumbens (L.) Desv. Alpine Azalea.

Common in alpine areas of Presidential Range, mostly in dry, peaty or rocky areas; collected at 4,000 feet elevation on Nelson Crag on Mt. Washington.

Kalmia latifolia L. Mountain-Laurel.

Frequent to common in southern Hillsboro and Cheshire Counties, mostly lacking in Connecticut Valley; of scattered occurrence in eastern and central New Hampshire, but extending north to Conway, Albany, and Thornton; extensive along southern shore of Squam Lake; rocky, mostly deciduous acid woods often in dry areas, but most luxuriant in moist woods or swamps: considerable variation in flower-color noted, but no extremes have been collected in New Hampshire: Rhodora 57: 34-36, 1955.

K. angustifolia L. Lambkill, Sheep-Laurel.

Common and widely distributed throughout New Hampshire at low and medium elevations, mostly in open situations; swamps, bogs, pastures and rocky slopes of lower mountains.

K. polifolia Wang. Pale or Bog-Laurel.

Frequent and of wide distribution of New Hampshire, acid bogs and peaty pond-shores; occurs in alpine areas in bogs.

Phyllodoce caerulea (L.) Bab.

Frequent on moist peaty slopes and heads of ravines in alpine areas of Presidential Range; one station known on Mt. Lafayette in Franconia Range.

Andromeda glaucophylla Link. Andromeda, Bog-Rosemary.

Frequent in northern New Hampshire, but usually in small colonies; at low and medium elevations, in bogs and boggy margins of ponds south to Enfield, Merrimack and Derry; apparently absent from southwestern New Hampshire and rare in the southeast.

Lyonia ligustrina (L.) DC. Maleberry.

Widely distributed and common at low altitudes in southern and central New Hampshire, north to Hanover, Center Harbor, and Conway; swampy woods, shores, and thickets.

Chamaedaphne calyculata (L.) Moench. var. **angustifolia** (Ait.) Fern. Leather-leaf.

General and common at low elevations, frequent at middle elevations; bogs, pond-margins, sedge-meadows, and open swampy woods.

Var. **latifolia** (Ait.) Fern. Leather-leaf.

Of similar habitat but rare in New Hampshire and of more northern range; specimen from Mt. Lafayette in Franconia Range is clearly this; specimens from Pittsburg, Livermore, Dover, Mt. Crawford, and Randolph approach this variety.

Cassiope hypnoides (L.) D. Don. Moss-plant.

Infrequent; in moist alpine areas of Presidential Range on Mts. Washington, Clay, Adams, and Monroe; confined to late-snow areas.

Epigaea repens L. var. **glabrifolia** Fern. Mayflower, Trailing Arbutus.

Rather infrequent in Coos County and Connecticut Valley, common elsewhere; low and medium elevations to 3,400 feet, in acid soils; too often gathered and exterminated in woods near cities: verbal report of forma *plena* Rehd., with double flowers from Plymouth.

Gaultheria procumbens L. Checkerberry, Teaberry, Wintergreen.

Generally distributed and common except in northern Coos County; mostly at low elevations in acid woods and slopes; most luxuriant and fruitful in cut-over woodlands, blueberry-pastures and burns: forma *elongata* Svenson, with elongated corolla was described from specimen collected in Holderness: Rhodora 25:184, 1923: forma *suborbiculata* Fernald, with greatly rounded leaves has been collected in Milan.

G. hispidula (L.) Bigel. Creeping Snowberry.

General and common in coniferous woods northward at low and medium elevations, occurring often in acid-bogs southward.

Arctostaphylos Uva-ursi (L.) Spreng. var. **coactilis** Fern. & MacBride. Common Bearberry, Kinnikinick.

Dry, sandy banks and shores, open slopes and ledges, at low elevations; usually localized and of disjunct distribution; probably throughout: Rhodora 16: 211-213, 1914.

A. alpina (L.) Spreng. Alpine Bearberry.

Infrequent; in small colonies in alpine area of Presidential Range (including Mounts Pleasant and Clinton); thin, dry soils.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
A. alpina	x									
Calluna vulgaris	i		i	i					i	
Gaylussacia dumosa var.										
Bigeloviana				x				x		
G. frondosa				x				x	x	
G. baccata	x	x	x	x	x	x	x	x	x	x
Vaccinium uliginosum										
var. alpinum	x	x	x							
V. caespitosum	x	x	x							
V. myrtilloides	x	x	x	x	x	x	x	x	x	x
V. vacillans var.										
vacillans	x		x	x	x	x	x	x	x	x
var. crinitum							x			
V. angustifolium var.										
angustifolium	x	x	x							
var. laevifolium	x	x	x	x	x	x	x	x	x	x
var. hypolasium	x	x		x		x	x			
var. nigrum	x	x	x	x	x	x			x	x
V. corymbosum var.										
corymbosum	x	x	x	x	x	x		x	x	x
var. albiflorum	x	x	x	x	x	x	x		x	x
var. glabrum		x	x	x	x	x	x	x	x	x
V. caesariense		x		x	x		x			
V. atrococcum		x	x	x	x	x	x	x	x	x
V. vitis-idaea var. minus	x	x	x					x		x
V. Oxycoccus var.										
Oxycoccus	x	x	x	x	s	x	x	x	x	x
var. ovalifolium	x									
V. macrocarpon	x	x	x	x	x	x	x	x	x	x
Diapensia lapponica	x		x							
Fraxinus americana	x	x	x	x	x	x	x	x	x	x
F. pennsylvanica var.										
austini		x		x				x	x	x
var. subintegerrima				i					x	x
F. nigra	x	x	x	x	x	x	x	x	x	x

Calluna vulgaris (L.) Hull., Heather.

Naturalized in Randolph, Waterville, Pelham, Durham, and Francestown; in latter two instances known to have been introduced with nursery stock: introduced from Europe.

Gaylussacia dumosa (Andr.) T. & G. var. **Bigeloviana** Fern. Dwarf Huckleberry.

In acid-bogs and borders of bog-ponds; collected only in southeastern New Hampshire in towns of Barrington, Lee, and Nottingham.

G. frondosa (L.) T. & G. Dangleberry.

Dry, mostly sandy woods, not common; reaches northern limit of range in southern New Hampshire in Barrington.

G. baccata (Wang.) K. Koch. Black Huckleberry.

Common in southern New Hampshire becoming infrequent northward, absent from northern Coos County; at low elevations extending upward to 2,700 feet; dry woods

and clearings, wet woods, bogs and edges of ponds: forma *glaucocarpa* (Robins.) Mackenzie, with fruits bluish and covered with bloom is general except in Coos County but is less common than typical (See Rhodora *2*:81-83, 1900): forma *leucocarpa* (Porter) Fern., with fruits whitish or pinkish has been collected in Jaffrey and Washington.

Vaccinium uliginosum L. var. **alpinum** Bigel. Alpine Bilberry.

Confined to mountain areas in northern part of state, occasionally descending to lower levels; common in alpine region of Presidential Range and rocky slopes and summits of lower mountains.

V. caespitosum Michx. Dwarf Bilberry.

Confined to northern New Hampshire; common in alpine area on Presidentials, less common in Franconia Range; occasionally descending to lower levels in sandy soils or river-ledges.

Locally occurring species of the subgenus *Cyanococcus* (blueberries) may cross and produce fertile hybrids if the chromosome-numbers are similar. *Vaccinum myrtilloides* with 2-n chromosomes is thus compatible with *V. angustifolum* also with 2-n chromosomes, *V. angustifolium* var. *laevifolium* with 4-n chromosomes is compatible with *V. corymbosum* also with 4-n chromosomes but not with *V. atrococcum* which has 2-n chromosomes. *V. vacillans* also with 2-n chromosomes might be expected to cross with *V. myrtilloides* or *V. angustifolium* if their ranges and habitats coincided. First generation progeny of *V. angustifolium* var. *laevifolium* with *V. corymbosum* are dark-fruited; later segregates are very diverse as to stature, fruit-color, size, etc., creating a taxonomic morass for the uninitiated.

V. myrtilloides Michx. Sour-top Blueberry.

Of rather general occurrence at low and medium altitudes throughout New Hampshire extending upward to rocky slopes of White Mountains; common in northern parts of state, becoming scarce southward: hybrids with other species of *Vaccinium* are not commonly found in New Hampshire; one reputed to be *V. myrtilloides*, X *V. angustifolium* var. *nigrum* was collected in Randolph: forma *chiococcum* (Deane) Fern. with whitish fruits has been collected in Gorham and reported from Shelburne by Farlow in Garden and Forest *2*:50-51, 1889.

V. vacillans Torr. Early Sweet Blueberry.

Common in southern New Hampshire, extending northward to Orford, Franklin, and Alton; outlying station in Shelburne; dry woods and warm rocky slopes.

Var. **crinitum** Fern.

Perhaps chiefly represents hybrids of *V. vacillans* and *V. atrococcum* or *V. myrtilloides;* specimen from Sumner's Falls, Plainfield, approaches it.

V. angustifolium Ait. var. **angustifolium.** Low Sweet Blueberry.

The diploid element of the species is chiefly montane to alpine in New Hampshire, with often somewhat questionable specimens from lower elevations; variations in height of stems and even in leaf-form are often variable in the same clone depending upon environmental conditions; var. *angustifolium* is common in alpine areas in dry locations, occasionally on lower mountains and at lower elevations.

Var. **laevifolium** House.

Tetraploid derivative of the last-named; common throughout at low and medium altitudes; in well drained and often rocky, acid soils; forma *leucocarpum* with fruits whitish has been collected in Fitzwilliam (see Rhod. *3*:263, 1901); pinkish-fruited plants occur in Strafford.

Var. **hypolasium** Fern.

Now considered to be a hybrid of *V. angustifolium* var. *angustifolium* and *V. myrtilloides;* occasional throughout.

Var. **nigrum** (Wood) Dole.

Less common than, but of same general range and habitat as var. *laevifolium;* often confused with black fruited hybrids of var. *laevifolium* and *V. corymbosum.*

V. corymbosum L. Highbush-Blueberry.

Common southward, becoming infrequent northward to southern Coos County; at low elevations; swamps, bogs, and old pastures; a very complex and variable species occurring with us in 3 sometimes clearly defined varieties.

Var. **corymbosum.**

Throughout the range.

Var. **albiflorum** (Hook.) Fern.

Throughout the range.

Var. **glabrum** Gray.

Throughout the range.

V. caesariense Mackenzie. Highbush-Blueberry.

Local in south and central New Hampshire with stations north to Newport, Gilmanton, and Tamworth; swamps, bogs and pond-shores; usually with *V. corymbosum* and often with the next.

V. atrococcum (Gray) Heller. Black Highbush-Blueberry.

Swamps, bogs and pond-shores; common in southern New Hampshire becoming less common in central New Hampshire north to Enfield, Wilmot, Gilmanton, and Tamworth.

V. Vitus-Idaea L. var. **minus** Lodd. Mountain-Cranberry.

Common in alpine areas of Presidential Range and rocky summits of lower mountains; occasionally in sandy soil at lower elevations; mostly in northern New Hampshire with outlying stations on Mt. Cardigan, Grafton County, Mt. Monadnock, Cheshire County, and at Hampton, Rockingham County.

V. Oxycoccus L. var. **Oxycoccus.** Small Cranberry.

Frequent in bogs and moist peaty areas throughout at low and medium elevations.

Var. **ovalifolium** Michx.

Suggests a hybrid state between *V. Oxycoccus* and *V. macrocarpon;* has been collected from Mt. Washington, and in Shelburne.

V. macrocarpon Ait. Large Cranberry.

Generally distributed throughout at low elevations; infrequent in northern part of state becoming common southward; bogs and shores.

Diapensia lapponica L.

Common in thin, dry soils in alpine areas of Presidential and Franconia ranges, also on Mt. Cannon, Dixville Notch, and southern part of Twin Range.

Fraxinus americana L. White Ash.

Common throughout most of state at low elevations in well-drained soils, often in rich woods; becoming infrequent north of White Mountains; forma *iodocarpa* Fern., with fruits purple is occasional.

F. pennsylvanica Marsh. var. **Austini** Fern. Red Ash.

Infrequent; lower Connecticut and Merrimack Valleys and north to Squam and Ossipee Lakes in east central New Hampshire; mostly on river-banks and near streams and shores.

Var. **subintegerrima** (Vahl.) Fern. Green Ash.

Formerly grown in plantations in Rollinsford and Lee, Strafford County, and now escaped and somewhat spreading, otherwise collected only from Pelham and Walpole where native.

F. nigra Marsh. Black or Brown Ash.

Swampy woods, shores and banks of streams; generally distributed throughout at low elevations; frequent and locally common.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
Syringa vulgaris	i	i	i	i	i			i		i
Ligustrum vulgare			i	i				i		i
Vinca minor				i						i
Phlox subulata		i	i	i	i					
Thymus serpyllum	i	i				i			i	i
Solanum Dulcamara	i	i	i	i	i	i	i	i	i	i
Lycium halimifolium			i	i					i	
Catalpa speciosa				i	i					
Mitchella repens	x	x	x	x	x	x	x	x	x	x
Cephalanthus occidentalis	x	x	x	x	x	x	x	x	x	x
Diervilla Lonicera	x	x	x	x	x	x	x	x	x	x
Lonicera villosa var. villosa	x	x	x					x		
var. Solonis	x		x				x	x	x	x
var. calvescens	x									
var. tonsa	x	x	x							x
L. Xylosteum	i			i						
L. Morrowi		i		i			i	i		
L. tatarica	i		i	i						
L. canadensis	x	x	x	x	x	x	x	x	x	x
L. sempervirens		i		i						
L. dioica			x				x	x		x
Symphoricarpus albus var laevigatus	i	i		i				s		
Linnaea borealis var. americana	x	x	x	x	x	x	x	x	x	x
Viburnum alnifolium	x	x	x	x	x	x	x	x	x	x
V. cassinoides	x	x	x	x	x	x	x	x	x	x
V. Lentago	x	x	x	x	x	x	x	x	x	x
V. Rafinesquianum								x		
V. recognitum	x	x	x	x	x	x	x	x	x	x

Syringa vulgaris L. Common Lilac.

Common escape over much of New Hampshire in vicinity of old dwellings and cellar-holes, long persisting and often spreading clonally: introduced from Europe: the state flower, much planted by early settlers.

Ligustrum vulgare L. Privet.

Occasionally spreading to dumps, roadsides, thickets, etc., in central and southern New Hampshire: introduced from Europe.

Vinca minor L. Periwinkle.

Occasional escape near habitations and long-persisting by roadsides in southern New Hampshire: introduced from Europe.

Phlox subulata L. Moss-pink.

Extensively spreading after planting near habitations, along roadsides, in cemeteries, etc., in southern and central New Hampshire: introduced from farther south in United States.

Thymus Serpyllum L. Creeping Thyme.

Occasional escape to roadsides, old fields and waste-places: introduced from Europe.

Solanum Dulcamara L. Bittersweet, Nightshade.

Occurs in mostly quite natural situations in thickets, along streams, shores of ponds, etc., at low elevations throughout: naturalized from Europe.

Lycium halimifolium Mill. Matrimony-vine.

Infrequent escape from cultivation; questionably persistent: introduced from Europe.

Catalpa speciosa Warder. Catalpa.

Frequently cultivated, occasionally persisting and escaping in central and southern New Hampshire: introduced from central United States.

Mitchella repens L. Partridge-berry.

Common throughout chiefly at low elevations; in woods: forma *leucocarpa* Bissell with whitish fruits has been collected in Keene.

Cephalanthus occidentalis L. Buttonbush.

Common in central and southern New Hampshire, infrequent in northern New Hampshire, north to Northumberland and Shelburne; at low elevations; in swamps, bogs, and borders of ponds and streams.

Diervilla Lonicera Mill. Bush-Honeysuckle.

Common and of general occurrence throughout at low and medium elevations, ascending to subalpine areas; rocky places, talus slopes, dry woods, thickets, and roadsides; often on or near summits of lower mountains.

Lonicera villosa (Michx.) R. & S. var. **villosa**. Mountain-Fly-Honeysuckle.

Frequent in northern New Hampshire, mostly at low elevations, as far south as Tamworth and Hanover; outlying station in Londonderry; bogs, barren fields, etc.; ascends to subalpine areas of Mt. Washington: for discussion of complex see Rhodora 37:11, 1925.

Var. **Solonis** (Eat.) Fern.

Bogs, pond-shores, swamps, and clearings; more abundant than the typical; northern New Hampshire at low elevations, ascending into alpine parts of Presidential and Franconia ranges, with outlying stations to south in Enfield, Canaan, Auburn and Winchester.

Var. **calvescens** (Fern. & Wieg.) Fern.

Mostly confined to alpine parts of Presidential Range, one station (Stewartstown) at lower elevation; in peaty or boggy places.

Var. **tonsa** Fern.

Infrequent; in northern New Hampshire extending southward to Conway; bogs and wet meadows and in moist peaty alpine areas in Presidential and Franconia ranges, outlying station in Jaffrey.

L. Xylosteum L. European Fly-Honeysuckle.

Locally escaped from cultivation to open woods and thickets: introduced from Europe or Asia.

Lonicera Morrowi and *L. tatarica* freely hybridize forming the hybrid *L. bella;* as a result of backcrossing and segregation, populations of very diverse genetic character may be produced which are impossible to name accurately.

L. Morrowi Gray.

Common escape to thickets, fence-rows and roadsides in southeastern New Hampshire; one station in Sullivan County; probably occurs elsewhere: naturalized from Europe or Asia.

L. tatarica L. Tartarian Honeysuckle.

Long cultivated and sometimes escaping nearby to thickets, fence-rows and borders of woods; less abundant as an escape than *L. Morrowi* in southeastern New Hampshire: introduced from Europe and Asia.

L. canadensis Bartr. Fly-Honeysuckle.

Frequent and locally common, probably throughout at low and medium elevations; ascending to 3,000 feet; cool and often rocky woods and ledges.

L. sempervirens L. Trumpet-Honeysuckle.

Ledges, dry woods, and thickets; probably always as an escape in our area; locally common in southern Strafford County, occurring also at Hart's Location and Tilton: introduced from farther south.

L. dioica L.

Local in Connecticut Valley, north to Bath; outlying stations in Windham and Derry; ledges, dry woods, thickets, and sandy river-terraces.

Symphoricarpus albus (L.) Blake var. **laevigatus** (Fern.) Blake. Snowberry.

Persistent around abandoned houses or cellar-holes, occasionally spreading locally to roadsides; stations occur in Coos County and to the south in Tuftonboro and Dover: introduced from Pacific Slope.

Linnaea borealis L. var. **americana** (Forbes) Rehd. Twinflower.

Cool moist woods throughout; common in northern New Hampshire at low and medium elevations, less common southward.

Viburnum alnifolium Marsh. Hobblebush, Moosewood.

Cool and moist woods, ravines, shores of ponds, and banks of streams; general and common in New Hampshire at low and medium elevations: forma *roseum* House, with pink flowers has been collected in North Woodstock and on Mt. Washington.

V. cassinoides L. Witherod.

In moist areas, thickets, woods and clearings, most abundant in swampy woods; common and general throughout at low and middle altitudes.

V. Lentago L. Nannyberry, Wild-raisin.

Locally common species extending northward in Connecticut Valley to Lyman, Grafton County and to Tamworth, Carroll County; outlying station in Shelburne, Coos County; thickets, stream-banks, and edges of woods in rich soils.

V. Rafinesquianum Schultes. Downy Arrow-wood.

Local and rare in New Hampshire; known from two positive collections in Derry and Windham and perhaps a third station in Milford; woods and roadsides: apparently are the farthest northeastern records for the species.

V. recognitum Fern. Arrow-wood.

At low altitudes in moist woods, damp thickets, and shores; occasional in Coos County, common southward.

	Co	Ca	Gr	St	Be	Me	Su	Ro	Hi	Ch
V. acerifolium	x	x	x	x	x	x	x	x	x	x
V. edule	x	x	x							
V. trilobum	x	x	x	x	x	x	x	x	x	
V. Opulus							i			
Sambucus canadensis	x	x	x	x	x	x	x	x	x	x
S. pubens	x	x	x	x	x	x	x	x	x	x
Iva frutescens var. oraria				x				x		

V. acerifolium L. Maple-leaved Viburnum.

At low altitudes in dry or rocky woods; occasional in Coos County; common in southern and central New Hampshire.

V. edule (Michx.) Raf. Squashberry, Mooseberry.

Infrequent; northern New Hampshire as far south as Conway, Waterville, and Benton; occasional at lower altitudes becoming more common at higher elevations, ascending to alpine area of Mt. Washington; moist cold woods, talus slopes, and along streams and shores.

V. trilobum Marsh. Highbush-Cranberry.

Moist often swampy woods at low elevations; frequent in northern New Hampshire, becoming local southward.

V. Opulus L. Guelder Rose.

Rare escape; only collection is from Plainfield; introduced from Europe.

Sambucus canadensis L. Common Elder, Elderberry.

Moist or rich soils in thickets, roadsides, and borders of woods and streams, mostly at low elevations; common and generally distributed throughout; one collection from summit of Mt. Washington (E. F. Williams); not observed there recently.

S. pubens Michx. Red-berried Elder.

Rocky slopes, ledges, openings in woods, and roadsides; common northward, ascending to medium elevations; in open woods, clearings, and wind-blown areas: forma *calva* Fern., with leaves glabrous beneath and branchlets glabrous is about as common as the species in New Hampshire and occurs throughout.

Iva. fruteseens L. var. **oraria** (Bartlett) Fern. & Grisc. Marsh-Elder, Highwater-shrub.

Reaches northeastern limit of range in United States in Portsmouth and along shores of Great Bay in Durham and Newmarket, reappearing however in Nova Scotia; salt-marshes and rocky shores; rare and local in New Hampshire: Rhodora 46:22, 1944 and 52:162-163, 1950.

List of Excluded Species and Varieties

A number of reports or specimens of woody plants from New Hampshire are open to much doubt. In several instances reports in the literature have been in error while in others the identification of herbarium specimens has been faulty.

It may be that certain of these will eventually be demonstrated to be present in the state. However, unless we have been able to locate a specimen or to find a station to confirm each taxon we have omitted it from the list.

Juniperus horizontalis Moench.

Reported by C. A. Weatherby, C. H. Knowlton, and R. C. Bean in Rhodora 28:43-46, 1926. They state on page 46, "*J. horizontalis* is, except for a single station on the slope of Mt. Equinox in Manchester, Vermont (Mary A. Day), confined to the immediate vicinity of the coast in Maine, New Hampshire, and extreme northeastern Massachusetts (Newbury)". Confusion may have resulted from the fact that the specimen in the Gray Herbarium from Oldtown Hill, Newbury, Massachusetts, was wrongly labelled Newbury, New Hampshire. As it is also known from Maine, it may yet turn up along some part of New Hampshire's short rocky coastline.

Carya tomentosa Nutt.

Reported by R. C. Bean, C. H. Knowlton, and A. F. Hill in Rhodora 58:127, 1956. This is based apparently on a specimen of *Carya ovata* var. *pubescens* from Durham that had been wrongly identified some years ago by Hodgdon.

Betula papyrifera Marsh var. **commutata** (Regel.) Fern.

Reported by Bean, Knowlton, and Hill in Rhodora 58:128, 1956. This again is based on a misidentification by Hodgdon. The specimen is much nearer to *B. papyrifera* var. *cordifolia*. This variety may turn up in the northern part of New Hampshire.

Ulmus Thomasi Sarg.

Reported by H. G. Jesup from Meriden, New Hampshire, in his "Catalogue of the Flowering Plants and Higher Crytograms Found Within About Thirty Miles of Hanover, New Hampshire", p. 37, 1891. In the Jesup Herbarium there is a specimen from Meriden labelled *U. racemosa*. This is one of the forms of *U. americana*. This species principally of calcareous regions might be expected in the vicinity of the Connecticut River, but rather careful search has not revealed it.

Menispermum canadense L.

Reported by Jesup, loc. cit., p. 2, from both sides of the Connecticut River at Claremont. Jesup cited Dr. Barrows as his authority. W. H. Blanchard in Rhodora 4:129-130, 1902, stated on the strength of the earlier report by Barrows, that it grew in Claremont. No specimens have been seen and a recent inspection of both banks of the Conecticut River at Claremont by the authors failed to reveal it.

Fraxinus pennsylvanica Marsh. var. **pennsylvanica.**

This is mentioned by Fernald in Rhodora 40:452-453, 1938, as "extending northward to Central Maine, the Connecticut Valley of New Hampshire, and Vermont". None of the specimens that we have seen from New Hampshire has been identified as typical *F. pennsylvanica* but careful collection may yet show it to be present. Mature fruits are necessary for positive identification.

Catalpa bignonioides.

Closely resembles *C. speciosa* and has been confused with it in herbaria. It is not as commonly planted. Careful examination of the records as well as field study have not shown it to be present.

Sambucus canadensis. L. forma chlorocarpa Rehd.

Forma *chlorocarpa* Rehd. with greenish fruits was described from New Hampshire in Sargent's Trees and Shrubs, 2:188, 1911; it was therein reported as growing wild near Wilmington Junction, New Hampshire, but since there is no such place listed in directories, the report from New Hampshire must be in error.

Selected Bibliography

The reader is directed to the final pages of the introduction for references to the most important floristic works dealing with the woody plants of New Hampshire and to the main body of the work for specific references to individual taxons. To save space most of these references are omitted here. For complete references to the principal floristic works see Blake and Atwood below, op. cit. The *Vascular Flora of Coos County* by Pease, cited below, has an excellent bibliography of works up to 1924 dealing with that area. An excellent source of literature before 1899 is the treatment on local floras of New England by Mary A. Day, also referred to below.

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